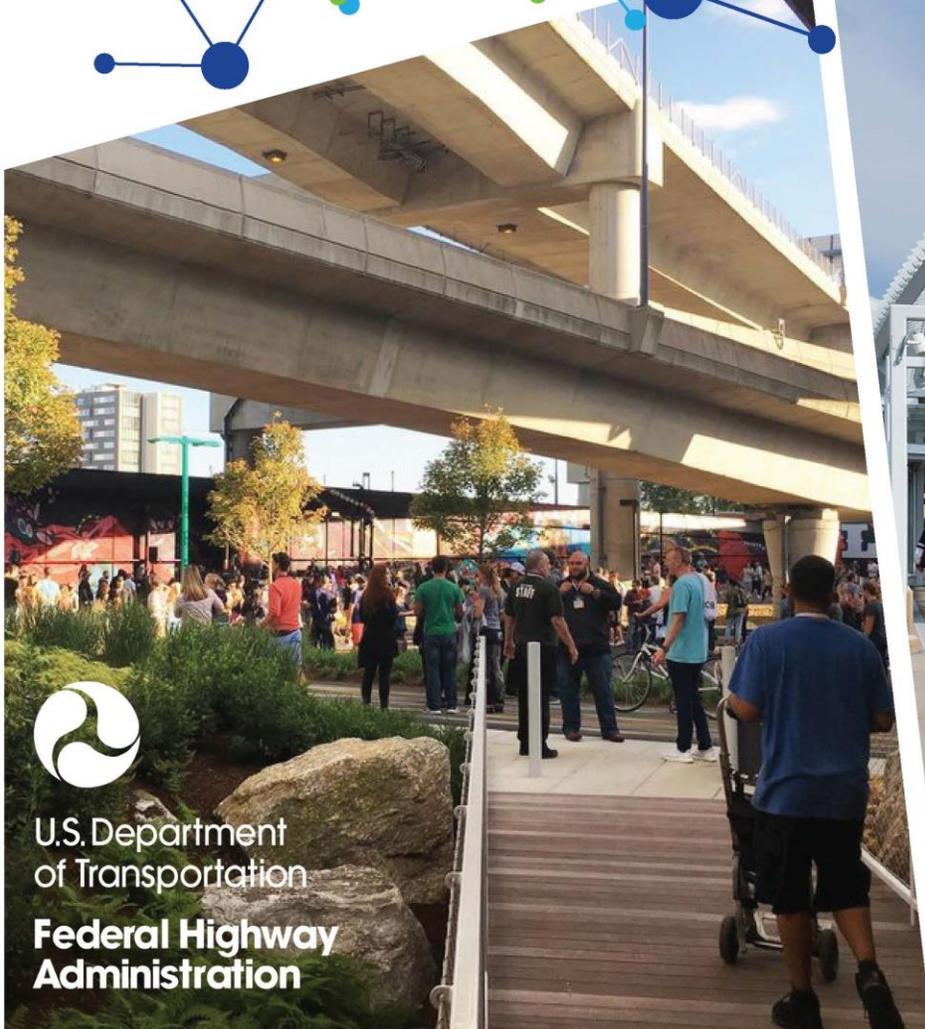


Community Connections Innovations Handbook



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Foreword	1
1. Community Connections Innovations	3
What is a Connected Community?	3
What is a Community Connection and What Can It Achieve?.....	3
What are the Benefits of Community Connections?	3
How Can Transportation Investments Support Community Connections?	3
When Can Transportation Agencies Implement Community Connections?	5
How Can Transportation Agencies Implement Community Connections?	6
2. Benefits of Community Connections	13
High-Performing Multimodal Transportation System.....	14
Improved Project Effectiveness and Efficiency	15
Informed Decision-Making	16
Improved Walkability and Bike-Ability	18
Enhanced Access to Services and Opportunities	19
Reduced Project Delivery Delay	21
Increased Sense of Place for Communities	21
3. Moving Forward	23
Identifying Community Connections Opportunities	24
Cultivating Community Connections Champions	24
Institutionalizing Community Connections	25
Applying Community Connections Across All Phases of a Project Life Cycle	26
Community Connections and the Planning and Project Development Process.....	26
Partnering with FHWA on Community Connections.....	28
Leveraging the Every Day Counts Program.....	28
Community Connections Toolbox	30
Analytical Tools and Planning Frameworks	34
Public Involvement Strategies	55
Project Development and Design Techniques	66
Operational Improvements and Programs	77
Case Studies	90

FOREWORD

The Federal Highway Administration's (FHWA) Community Connections initiative is about using transportation innovations, partnerships, and technologies to bring communities together and connect people to services and opportunities.

Community Connections marries the success of the Every Day Counts (EDC) program with best practices in transportation planning. EDC is a State-based model that rapidly deploys proven, yet underutilized, innovations to shorten the project delivery process, enhance roadway safety, reduce traffic congestion, and improve environmental sustainability. Through a collaborative process, FHWA, State Departments of Transportation (DOTs), and others identify a new collection of innovations to champion every two years.

In 2016, FHWA's Offices of Planning, Human Environment, Project Development and Environmental Review, and Infrastructure collaborated with the FHWA Resource Center and United States Department of Transportation's (USDOT) Volpe Center on the fourth round of EDC to integrate transportation planning innovations into the community of practice for State DOTs, metropolitan planning organizations (MPOs), local and tribal governments, and other transportation practitioners.

To do so, FHWA integrated its existing place-based programs, tools, and strategies involving community impact assessments, flexibility in design, livability in transportation, sustainability, Ladders of Opportunities, Context Sensitive Solutions, Complete Streets, and more, into a unified initiative. What these innovations all have in common is the commitment from transportation agencies to improve communities and advance community goals through the transportation planning process – building from successes and issues in community design, land use, environmental protection and enhancement, mobility and accessibility, public health, and economic well-being.

What Community Connections does differently is focus this lens at the project development level, spurring adoption across all States through the EDC innovation pathway, emphasizing the different ways to connect or reconnect communities through multimodal improvements and community revitalization efforts. All of which helps meet the 2018-2022 USDOT Strategic Plan Goals of:

- **Safety** – Reduce transportation-related fatalities and serious injuries across the transportation system.
- **Infrastructure** – Invest in infrastructure to ensure mobility and accessibility and to stimulate economic growth, productivity and competitiveness for American workers and businesses.
- **Innovation** – Lead in the development and deployment of innovative practices and technologies that improve the safety and performance of the nation's transportation system.
- **Accountability** – Serve the nation with reduced regulatory burden and greater efficiency, effectiveness and accountability.

This handbook is meant for a wide range of practitioners involved in project planning and development, including:

- **Project implementers** (i.e., sponsors) such as state, regional, municipal, or tribal transportation project planners, designers, or operators.
- **Project planners** at federal, state, regional, municipal, tribal levels with approval authority or supporting roles for project planners.
- **Cross-disciplinary community planners or providers** (health, education, enforcement, etc.).

The purpose of this Handbook is to help practitioners understand and apply Community Connections Innovations in their work and to inspire greater collaboration for project success. The Handbook provides a wealth of information including more detailed information and examples on the benefits of Community Connections projects; a Toolbox of techniques, strategies, and approaches; and the first steps of applying Community Connections.

Through this Handbook, these tools and resources cover a wide range of contexts, scales, project sizes and types, modes, and applications – illustrating the different ways these tools can be leveraged for outcomes that engage communities more effectively, improve multimodal access, and streamline project delivery.

1. COMMUNITY CONNECTIONS INNOVATIONS

What is a Connected Community?

A connected community is one that is safe, accessible, affordable, convenient, and that features reliable multimodal mobility options. It is accessible to all transportation users and connected to other communities through sustainable and resilient transportation networks and systems in a state of good repair. Connected communities come in all varieties of sizes, contexts, and locations (i.e. large urban, small urban, suburban, and rural).

What is a Community Connection and What Can It Achieve?

From a programmatic perspective, Community Connections is about using transportation innovations, partnerships, and technologies to bring communities together and to connect people to services and opportunities. In the transportation project context, a Community Connection is an individual facility, asset, or service that connects people to services and opportunities. In combining the program and project-level approaches, Community Connections projects are those that:

- Engage communities more effectively.
- Improve multimodal access.
- Revitalize communities or enhance economic competitiveness.
- Deliver successful outcomes.

What are the Benefits of Community Connections?

The benefits of Community Connections are numerous and include both measures of effectiveness traditionally used to describe transportation system performance as well as metrics that describe larger community benefits beyond the disciplines of transportation planning and engineering. These benefits include:

- High-performing multimodal transportation system.
- Improved project effectiveness and efficiency.
- Informed decision-making.
- Improved walkability and bike-ability.
- Enhanced access to services and opportunities.
- Reduced project delivery delays.
- Increased sense of place for communities.

How Can Transportation Investments Support Community Connections?

Every day, transportation practitioners are exploring new ways to plan, design, implement, and construct transportation projects and programs that enhance the economy, create jobs, and benefit communities by improving the quality of life. However, many of them are balancing

competing concerns and conflicting community needs and desires against a backdrop of complex environmental, physical, and social contexts. In their day-to-day work, transportation professionals may struggle with these issues. The Community Connections approach and Toolbox can help practitioners plan and design projects that address these issues in many different ways. By employing Community Connections tools and strategies, practitioners can:

- **Invest** to create new community outcomes, such as a streetscape improvement project defined as part of a community revitalization plan.
- **Renew** to improve connectivity, such as a freeway teardown that replaces old and obsolete infrastructure with new multimodal facilities.
- **Restore** by addressing unanticipated consequences of past transportation investments, such as a highway cap in an urban center that activates the city space.
- **Repair** the potential downsides of a particular investment by creating a new offsite transportation investment or connection, such as one provided as part of an environmental stewardship program.

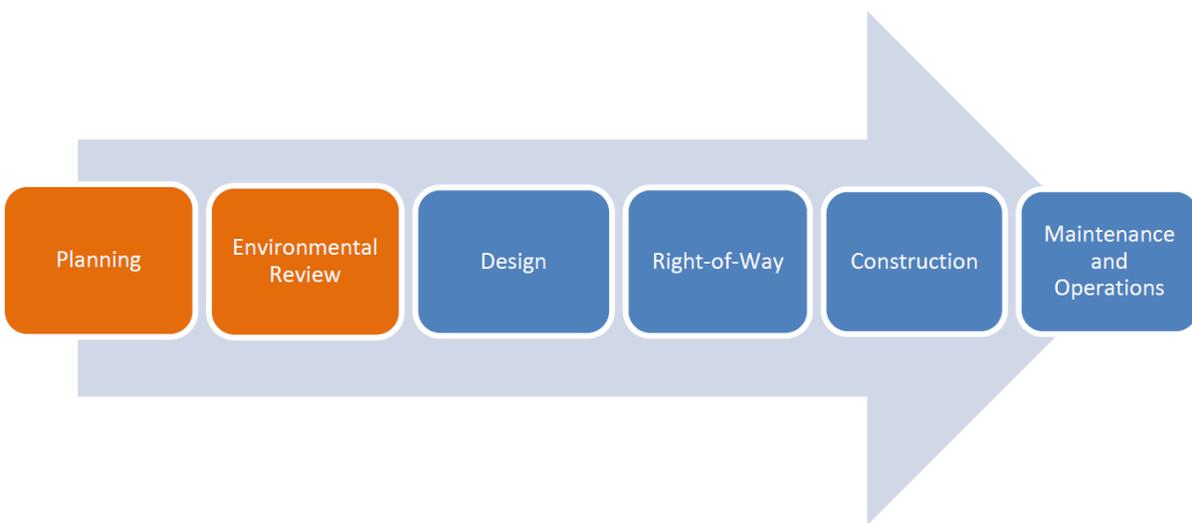
Project Type	 INVEST	 RENEW	 RESTORE	 REPAIR
Definition	Address a specific need or leverage a new opportunity to generate community benefits, irrespective of impacts associated with other prior or concurrent projects. Create community benefits through transportation infrastructure projects.	Address older projects at the end of their life cycle. Rehabilitate or reconstruct in manners that provide enhanced community benefits.	Alleviate or reverse adverse community impacts associated with recent transportation investments.	Reduce or offset potential adverse impacts associated with a new transportation project. Address community needs through project development mitigation.
Project Example	A streetscape improvement project defined as part of a community revitalization plan is an example of <i>Invest</i> .	A freeway teardown that replaces old and obsolete infrastructure with improved connectivity is an example of <i>Renew</i> .	A highway cap in an urban center is a <i>Restore</i> example, addressing unanticipated consequences of past transportation investments.	A new offsite transportation connection provided as part of an environmental stewardship program is a <i>Repair</i> example.

Investment opportunities span a wide range of project types and strategies, including highway underpass improvements, highway tunnels, highway conversions, new highway and bridge

replacement or reconstruction, Context Sensitive Solutions, Complete Streets, road diets, bicycle and pedestrian improvements, transit improvements (service improvements, expanded access to services and stations, and user accommodations), Intelligent Transportation Systems (ITS), Transportation Systems Management and Operations (TSMO), safety improvements, and shared mobility services.

Projects of all types can successfully deliver on Community Connections provided they are focusing on improving multimodal access, engaging communities more effectively, revitalizing communities and enhancing economic competitiveness.

When Can Transportation Agencies Implement Community Connections?



Stages of transportation project development (Source: FHWA¹).

Transportation agencies can implement Community Connections strategies at any phase in the project life cycle. Ideally, agencies will embrace Community Connections philosophies throughout their project development process, from initial planning activities all the way through to maintenance and operations. Chapter 3 of this handbook provides guidance on specific activities that can be undertaken to begin incorporating Community Connections principals within a transportation agency.

Importantly, these activities should account for stakeholder concerns about past transportation actions. These concerns may include:

- Past transportation investments physically divided communities, making it difficult or unsafe to get from one place to another.
- Past investments created a lack of reliable transportation options that hinder community members from accessing opportunities for jobs, housing, education, health care, healthy food, recreation, and important social services.

¹https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/fhwahep15035..pdf

- Past investments relied too heavily on automobiles as the primary or sole transportation option.
- Lack of investment created aging and worn infrastructure that degrades system quality, reliability, and safety.
- Limited system connectivity contributes to indirect travel routes, increasing vehicle-miles of travel and associated adverse impacts such as congestion, noise, and air quality.
- Past actions overlooked opportunities to repurpose transportation rights-of-way better uses, including prioritizing different modal options, establishing civic space, or converting unneeded right-of-way to developable property contributing to the community tax base.

These concerns should be evaluated programmatically through the transportation agency's systems planning, project planning, and environmental review processes. At the systemwide level, community values for planning and prioritizing different types of connections can be best reflected in the project development and prioritization process. As individual projects are developed, agencies should apply the Toolbox concepts to achieve closer coordination with local community stakeholders on design and construction elements. After projects are constructed, agencies can use both the systemwide and local lenses to consider how the built projects are aging and what improvements might be warranted during maintenance and operations throughout the project's useful life.

How Can Transportation Agencies Implement Community Connections?

To ensure that transportation agencies are successful at implementing Community Connections, FHWA has developed a series of Guiding Principles, a comprehensive Toolbox of innovative tools and strategies, and sixteen case studies.

Guiding Principles

These Guiding Principles are a set of recommended approaches to assist transportation agencies in successfully implementing Community Connections. Agencies should follow these Community Connections principles through the project development process:

- Envision and plan with the community to understand their transportation needs.
- Approach projects holistically to consider all opportunities small or large, to improve communities through better transportation that leads to other desired community outcomes.
- Consider the needs, security, and safety of all transportation system users.
- Build collaborative partnerships with traditional and nontraditional partners (e.g., interagency, multidisciplinary, State-local, public-private).
- Embrace innovation, technology, flexibility, creativity, and multimodal approaches to address each community's unique challenges, especially those that are performance-based.

Community Connections Toolbox

The Community Connections toolbox is broadly organized into four categories that address a diverse array of project types and contexts:

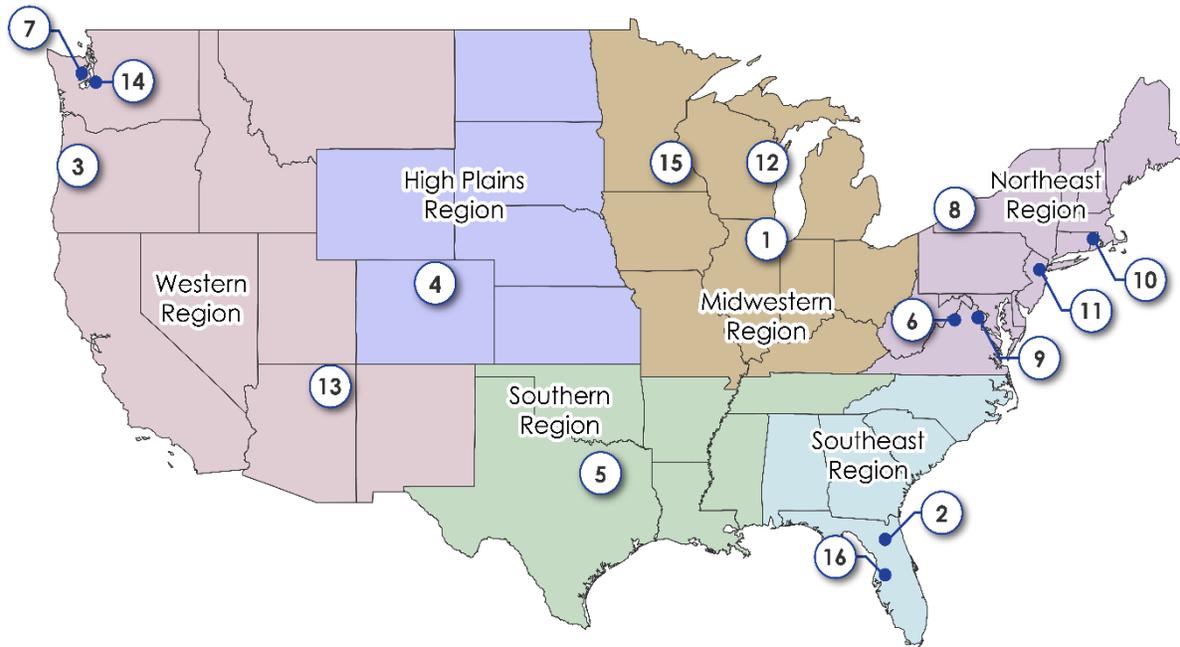
- **Analytical Tools and Planning Frameworks** – approaches to identify the project vision, parameters, and approaches.
- **Public Involvement Strategies** – best practices in planning to implement a community’s vision.
- **Project Development and Design Techniques** – project level approaches to improve Community Connections.
- **Operational Improvements and Programs** – strategies to enhance accessibility, mobility, and safety.

Community Connections isn’t about changing your tools, it’s about changing how you use them.

Analytical Tools & Planning Frameworks	Public Involvement Strategies	Project Development & Design Techniques	Operational Improvements & Programs
<ul style="list-style-type: none"> • Bicycle and Pedestrian Assessments. • Community Impact Assessments. • EconWorks. • Environmental Justice/Equity Analyses. • Geographic Information Systems (GIS) Innovations. • Health in Transportation. • Planning and Environmental Linkages. • PlanWorks. • Road Safety Audits. • Scenario Planning. 	<ul style="list-style-type: none"> • Design Charrettes. • Experiential Public Engagement. • Stakeholder Engagement. • Virtual Public Engagement. • Visualization Techniques. 	<ul style="list-style-type: none"> • Community Benefits Agreements. • Complete Streets. • Context Sensitive Solutions. • Performance-Based Practical Design. • Road Diets. 	<ul style="list-style-type: none"> • Expanded Access to Transit. • Freight First-Mile / Last-Mile Connections. • Improved Transit Service. • Pilot Projects. • Shared Mobility Services. • Transit User Accommodations.

Case Studies

Sixteen projects from around the nation demonstrate applications from the Toolbox and the benefits of Community Connections. In addition to geographic diversity, these projects differ in scope, size, and type to demonstrate that Community Connections approaches and tools can be applied in many different contexts.



PROJECT #	PROJECT NAME	CITY/COUNTY	STATE
1	41 st Street Pedestrian and Bike Bridge	Chicago	Illinois
2	Depot Avenue Multimodal Corridor	Gainesville	Florida
3	Emerald Express Green Line	Eugene and Springfield	Oregon
4	Federal Boulevard Improvements (West 5 th Avenue/Howard Place)	Denver	Colorado
5	Klyde Warren Park	Dallas	Texas
6	Luray-Hawksbill Greenway Trail	Luray	Virginia
7	Manchester Stormwater Park	Manchester	Washington
8	Niagara Scenic Parkway	Niagara Falls	New York
9	Poland/Edgewater Instant Roundabout	Loudoun County	Virginia
10	Route 6/10 Connector Project	Providence	Rhode Island
11	Route 18 Improvement Project	New Brunswick	New Jersey
12	State Route 54 and Duck Creek Bridge	Brown County	Wisconsin
13	State Route 264 Safety Improvements	Navajo County	Arizona
14	State Route 520 Eastside Transit and High-Occupancy Vehicle Program	King County	Washington
15	Target Field Station	Minneapolis	Minnesota
16	U.S. Route 301/Gall Boulevard Widening and Realignment	Zephyrhills	Florida



Urban City/Trail Development
(©City of Chicago).

1) 41st Street Pedestrian and Bike Bridge - Chicago, IL (\$29M)

- New bicycle and pedestrian bridge over railroad tracks and major road.
- Bridge increases access between a historically disenfranchised community and lakeshore trail system.



Completing the Street
(©City of Gainesville).

2) Depot Avenue Multimodal Corridor - Gainesville, FL (\$15M)

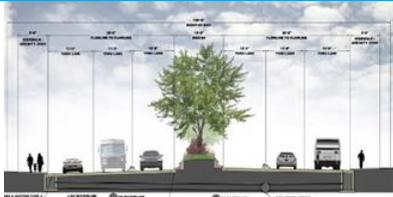
- Provides multimodal access to a major university, hospital, regional transportation hub, and rail-trail network.
- Iconic bicycle-pedestrian bridge is a signature gateway to the corridor.
- Incorporates numerous aesthetic and placemaking elements.



Integrated Bus Rapid Transit (BRT) (©2011 Wolfram Burner).

3) Emerald Express Green Line - Eugene and Springfield, OR (\$25M)

- First leg in a regional BRT network vision.
- Exclusive right-of-way (ROW) and limited stops.
- Holistic transit and active transportation connections.



Completing the Street
(©City and County of Denver).

4) Federal Boulevard Improvements (West 5th Avenue / Howard Place) - Denver, CO (\$34M)

- Busy commercial corridor, north-south link; 2nd-highest transit ridership in the city.
- Improved sidewalks, median landscaping for safety, and transit improvements.
- Part of larger corridor plan; public social media campaign.



Highway Transformation
(©OJB Landscape Architects).

5) Klyde Warren Park - Dallas, TX (\$110M)

- 5-acre deck park over recessed eight-lane freeway, linking uptown and downtown Dallas.
- Flexible outdoor space supporting year-round use.
- Generated over \$1B in economic benefit for the surrounding neighborhoods.



Urban City/Trail Development
(©Town of Luray).

6) Luray- Hawksbill Greenway Trail - Luray, VA (\$3.5M)

- New open space and improved access to amenities.
- Enhances connectivity between the downtown area and residential districts.
- Provides valuable health and recreational benefits, including access to individuals with disabilities.



Stormwater Management Initiatives (©Kitsap County Public Works).

7) Manchester Stormwater Park - Manchester, WA (\$4M)

- Retrofitted a brownfield site into a stormwater treatment site.
- Improved pedestrian access and traffic flow as part of stormwater retrofit.



Highway Transformation (©New York State Office of Parks, Recreation and Historic Preservation).

8) Niagara Scenic Parkway - Niagara Falls, NY (\$42M)

- Removal of 2 miles of parkway and replacing with open spaces and a trail network.
- Linking isolated green spaces into an unbroken green corridor along the Niagara Gorge rim.



Safety + Improvements (©Virginia DOT).

9) Poland / Edgewater Instant Roundabout - Loudoun County, VA (\$90,000)

- Responded quickly to serious crash/injury problem.
- Low cost makes it replicable for other agencies.
- Promoted as part of Every Day Counts-2 for intersection and interchange geometrics.



Highway Transformation (©Rhode Island DOT).

10) Route 6/10 Connector Project - Providence, RI (\$410M)

- New significant bike and pedestrian connections.
- Bridge replacement and demolition.
- New redevelopment opportunities through repurposed right-of-way.



Safety + Improvements (©New Jersey DOT).

11) Route 18 Improvement Project: New Brunswick, NJ (\$200M)

- Replacement of 6 bridges and new local roads led to new bicycle and pedestrian facilities.
- New and improved community spaces such as a promenade, park access, and amphitheater.
- Formalized community partnership teams brought all issues and stakeholders to the table.

 <p><i>Highway Transformation (©Mead and Hunt).</i></p>	<p>12) State Route 54 and Duck Creek Bridge - Brown County, WI (\$5.4M)</p> <ul style="list-style-type: none"> • Upcycled failing historic bridge into bicycle/pedestrian route. • Assembled gateway design using new bridge, new highway alignment, roundabouts, and retaining wall. • Built Oneida art into the project’s foundations, both figuratively and literally.
 <p><i>Safety + Improvements (©Sunland Asphalt).</i></p>	<p>13) State Route 264 Safety Improvements - Navajo County, AZ (\$17M)</p> <ul style="list-style-type: none"> • Safety hotspots identified through a statewide analysis. • Multimodal facilities delivered a better return on investment.
 <p><i>Highway Transformations (©Washington State DOT).</i></p>	<p>14) State Route 520 Eastside Transit and High-Occupancy Vehicle Program - King County, WA (\$363M)</p> <ul style="list-style-type: none"> • Adds transit/high-occupancy vehicle lanes, shoulders, bicycle-pedestrian elements and three landscaped highway lids. • Compatible with potential future light rail system. • Provides environmental enhancements including “fish-friendly” culverts.
 <p><i>Multimodal Transportation Centers (©Perkins Eastman).</i></p>	<p>15) Target Field Station - Minneapolis, MN (\$79.3M)</p> <ul style="list-style-type: none"> • Provides intermodal connectivity between light rail, commuter rail and city buses. • Improves surrounding street grid, enabling better and safer access to public transit. • Incorporates placemaking elements. • Design accommodates future light rail lines.
 <p><i>Completing the Street (©Greater Zephyrhills Chamber of Commerce).</i></p>	<p>16) U.S. Route 301/Gall Boulevard Widening and Realignment - Zephyrhills, FL (Design: \$3.4M; right-of-way: \$26M)</p> <ul style="list-style-type: none"> • Reroute US 301 to avoid the downtown core through existing couplets. • Widen the new 301 to meet freight demand. • Addition of new bike lanes and sidewalks.

The purpose of this Handbook is to help practitioners understand and apply Community Connections Innovations in their work and to inspire greater collaboration for project success. The Handbook provides a wealth of information including:

- More detailed information and examples on the benefits of Community Connections projects in Chapter 2.
- A primer on applying Community Connections in Chapter 3.
- A Toolbox of techniques, strategies, and approaches.
- A set of Case Studies showing how others have connected their communities.

These chapters cover a wide range of contexts, scales, project sizes and types, modes, and applications illustrating different ways these tools can be leveraged for outcomes that engage communities more effectively, improve multimodal access, and streamline project delivery.

2. BENEFITS OF COMMUNITY CONNECTIONS

Community Connections projects provide many different types of benefits, spanning from transportation ones like multimodal improvements to community design to improved government operations.

Benefit	Definition	Approaches
High-performing multimodal transportation system.	An integrated system covering multiple modes and transportation services that provides safe, accessible travel choices.	<ul style="list-style-type: none"> Plan and develop projects for the network. Enhance corridors that connect existing centers. Replace deficient infrastructure with more complete facilities.
Improved project effectiveness and efficiency.	Projects that support immediate transportation conditions in the most economically efficient manner.	<ul style="list-style-type: none"> Assess safety comprehensively. Respond to problems and challenges creatively. Improve infrastructure condition.
Informed decision-making.	Use of information from the community and the data analytics to make decisions.	<ul style="list-style-type: none"> Conduct robust analyses. Engage stakeholders. Phase implementation of community plans.
Improved walkability and bike-ability.	Affordable, safe, and convenient modes of transportation.	<ul style="list-style-type: none"> Prioritize bicycle/pedestrian projects for investment. Incorporate new bicycle/pedestrian facilities into projects. Support new or existing transit service.
Enhanced access to services and opportunities.	Residents and visitors can access existing and new opportunities, such as to jobs, education, and recreation.	<ul style="list-style-type: none"> Connect to regional economic opportunities. Connect to community facilities and assets. Include more users.
Reduced project delivery delays.	Better transportation projects in less time.	<ul style="list-style-type: none"> Engage constituents more effectively. Streamline implementation of committed projects. Implement pilot projects.
Increased sense of place for communities.	Transportation investments enhance local place-based identity.	<ul style="list-style-type: none"> Incorporate community ideas and assets. Create welcoming gateways. Enhance civic presence.

The following pages provide additional details on each of these key benefits of Community Connections with demonstrated project examples and approaches practitioners can implement to achieve these benefits.

High-Performing Multimodal Transportation System

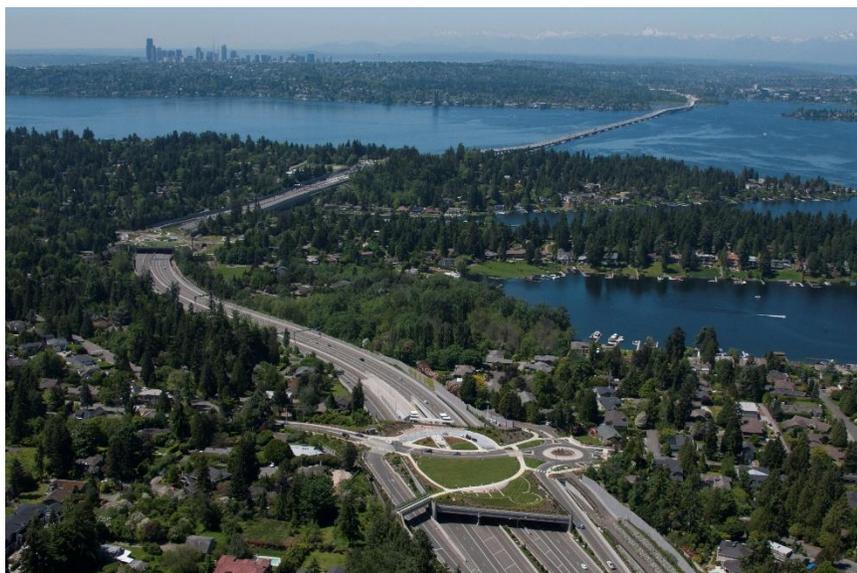
The transportation industry continues to advance the development of a high-performing multimodal transportation system that is safe, ensures mobility and accessibility, and stimulates economic activity. This involves continuous improvement of the existing modal systems and investment in new complementary modes and services – all within an interconnected network of systems.

Plan and Develop Projects for the Network

Many transportation projects fill gaps within the same mode. However, developing projects from the multimodal network perspective can reap greater community benefits. For example, Target Field Station was driven by the popularity of the transit service to the Minnesota Twins stadium and the desire to leverage that demand within the larger neighborhood. This station connects new platforms and light rail lines for all residents and visitors. They can come by bus, by car, by walking, by biking or bikesharing. They can also stay for the games or enjoy the public art or events at the amphitheater. These efforts serve both the stadium visitors but also the day-to-day residents and workers in the immediate area.

Enhance Corridors that Connect Existing Centers

In some cases, the transformation of a transportation corridor between existing centers with a multimodal emphasis provides important transportation options to existing and future residents. In King County, Washington, the Washington State DOT addressed existing growth and development between Seattle and the “Eastside” of Lake



Bird's eye view of the SR520 Eastside corridor (©Washington State Department of Transportation).

Washington. The SR 520 project added transit and high-occupancy vehicle (HOV) lanes, enhanced transit user accommodations, widened the shoulders, and maintained compatibility with a potential future light rail system. The project also fills critical gaps in the regional bike network, including a 12-mile trail between Seattle and Redmond.

Replace Deficient Infrastructure With More Complete Facilities

The FHWA Every Day Counts initiative promotes implementation of Community Connections even as a part of routine maintenance, such as implementing Complete Streets through restriping and repaving projects. Sometimes projects are at the end of their useful lifespan, and replacing them may not sufficiently advance high-quality multimodal transportation objectives. In some cases, replacing deficient transportation elements can be a significant investment, so the opportunity exists to improve Community Connections as part of already budgeted life cycle costs. In Providence, RI, replacing deficient bridges has led to a transportation solution with new bike and pedestrian connections, reduced highway conflict points for automobiles, and new land for future redevelopment that can itself provide fiscal benefits through an increased tax base. The project also had a lower cost and better benefit-cost ratio over the other alternatives.



Temporary but longstanding bridge supports in Providence, Rhode Island (©Rhode Island Department of Transportation).

Improved Project Effectiveness and Efficiency

Community Connections is about conceptualizing and developing better projects that advance community visions and goals. Within that framework, though, is the need to meet important transportation objectives of improved safety and upgraded infrastructure condition.

Assess Safety Comprehensively

Many agencies have developed robust and comprehensive methods for assessing safety. For example, the Arizona DOT undertook a statewide safety analysis to understand the full extent of its communities' safety concerns. The agency used the findings of this analysis to prioritize projects and economize across similar projects. From this statewide analysis, the DOT used Performance-Based Practical Design to identify the most cost-effective alternative. The DOT plans to use the findings from this approach to address other like-safety projects across the state.

Respond to Problems and Challenges Creatively

A great example of a quick and low-cost Community Connections application is the Poland/Edgewater Instant Roundabout. The project was driven by local community concerns about safe access to and from their neighborhood stemming from high crash volumes in the area. Virginia DOT did not wait for the full design and funding process.



Temporary “instant” roundabout (©Virginia Department of Transportation).

Instead, they created an instant roundabout using off-the-shelf materials in 6 days. This initiative has been so successful that Virginia DOT began constructing a permanent roundabout in 2018. In Brown County, WI, the Wisconsin DOT could not justify renovating an older deficient bridge solely for truck and automobile traffic. Instead, they constructed a new bridge nearby and preserved this historic community asset as a bicycle and pedestrian bridge. This action increased multimodal connectivity and created a community centerpiece. This solution developed with the community shows how thoughtful approaches can improve the entire project process and outcome.

Improve Infrastructure Condition

Many transportation infrastructure projects are driven by a need to address bridge and pavement deficiencies and a need to maintain the existing network. However, many Community Connections projects do more than just improve the facility condition – they aim to achieve a greater diversity of important community outcomes. For example, in Zephyrhills, Florida, the freight route was changed to help support community-based downtown revitalization. In this case, improving the condition was achieved by changing the facility’s designation.

Sometimes improving infrastructure condition is recognized as a need, but the proposed improvements fail to address greater needs. In Providence, RI, the Route 6/10 Connector languished with bridge deficiencies and temporary safety supports for 15 years before an agreed upon Community Connections solution was identified. This solution will improve the bridges but also improve the traffic flow, create new bicycle and pedestrian facilities, and open up almost five acres in downtown Providence for development.

Informed Decision-Making

Community Connections projects rely on performance data and stakeholder input to help decision-makers and practitioners understand a community’s needs and collaborate on a vision

for change. Informed decision-making incorporates robust technical analyses, meaningful stakeholder participation, and a phased approach to implementing community-supported plans.

Conduct Robust Analyses

Several Community Connections tools integrate best practices from a wide range of technical disciplines to integrate multimodal transportation accessibility, mobility, and safety objectives with impacts to the natural and built environments. The Planning and Environmental Linkages (PEL), PlanWorks, and EconWorks tools are examples of strategies to improve performance across agency silos. The Denver Department of Public Works utilized a PEL study for their Federal Boulevard project to consider both current needs and future changes associated with access to a planned light rail station. The PEL approach for this project resulted in a streamlined environmental review.

Engage Stakeholders

Informed stakeholder participation includes both leveraging the robust technical analysis as a basis for decision-making, as well as considering qualitative elements that might not be directly reflected in the technical findings. The Road Safety Audit approach supplements the technical analysis with qualitative, cross-disciplinary participation from local practitioners in fields such as law enforcement, emergency response, education, and health. These practitioners can help frame the data in the context of the travel behaviors they are trained to observe. For example, a school principal might understand and be able to identify and help resolve safety concerns regarding a local pedestrian shortcut across a busy highway even if the concern is not evident from crash data.

The New Jersey DOT served as a pioneer of the Community Connections approach by designating a Community Partnering Team to help implement a Context Sensitive Solution for Route 18 in New Brunswick. The Community Partnering Team helped make decisions regarding corridor aesthetics, design/development, Boyd Park improvements, traffic management, and public safety. It included 198 members and comments were integrated into project decisions through 85 different meetings and events

Phase Implementation of Community Plans

Decision-making can be streamlined by commitments to phased implementation of community supported plans. For example, the 41st Street Pedestrian and Bike Bridge in Chicago, IL was conceived of during the development of the Bronzeville/South Lakefront neighborhood area plan. The establishment of specific project-level actions in areawide plans helps provide an implementation roadmap that gives broader context for project purpose and need and helps retain community buy-in and support for implementation.

Improved Walkability and Bike-Ability

Transportation decision-making that prioritizes multimodal access helps lead to improved walkability and bike-ability. Walkability and Bike-ability can be enhanced in several different ways.

Prioritize Bicycle/Pedestrian Projects for Investment

Bicycle and pedestrian projects often lack the agency support or funding consideration given to other project types. Prioritizing these projects can fill important gaps in the multimodal network. In some cases, this means prioritizing bicycle and pedestrian projects for funding. For example, the 41st Street Pedestrian and Bike Bridge was identified as an important community asset in Southside Chicago to support economic development and to connect the neighborhood to Lake Michigan.

Incorporate New Bicycle/Pedestrian Facilities Into Projects

Including pedestrian and bicycle considerations in corridor plans and subsequent projects improves walkability and bike-ability. New facilities can include project types such as the following examples:



View of Klyde Warren Park in Dallas, TX (©OJB Landscape Architecture).

- Bike lanes on Depot Avenue in Gainesville, FL.
- Connecting a new bike/pedestrian bridge and nearby park trails to a new bike trail system in Klyde Warren Park, in Dallas, TX.
- A new bike bridge upcycled from an older historic bridge that connects to neighborhood trails in Oneida Nation, WI.

Practitioners can incorporate these modes in many different ways through a variety of contexts.

Support New or Existing Transit Services

Walking and bicycling facilities not only connect community members to the goods and services they need, but they also serve as first-mile and last-mile connections to transit. Access to transit connections commonly include constructing new or improved sidewalks to link transit stops to nearby destinations. These connections can also include safer means to cross a street served by transit or on-board accommodations such as bike racks on buses or low-floor kneeling buses for rider accessibility. Direct benefits of improved walking and bicycling connections include a greater number of new transit riders that could improve transit service efficiency and contribute to reduced congestion. Indirect benefits can extend to increased access to jobs, shopping, education, health care, and other services important to activities of daily life, particularly for

disadvantaged populations. Improved access to transit can also become a community asset in its own right. For example, Target Field Station in Minneapolis created a hub of programmed community space that succeeds in part due to its ability to link the transit system to the surrounding community.

Enhanced Access to Services and Opportunities

Access to services and opportunities is one of transportation's most critical outcomes. Reliable and well-connected transportation infrastructure enhances access to services and opportunities such as jobs, housing, education, health care, healthy food, recreation, and social services – all the things that make up people's days and lives. Multimodal options are especially important for those who lack access to personal vehicles.

Connect to New Regional Economic Opportunities

Many projects enhance access to services and opportunities. For example, in Eugene, OR, the new BRT line improved headways making transit a more robust, reliable and accessible option. This action tripled ridership over the previous route. The new bike and pedestrian bridge in Chicago, IL, will connect the neighborhood to larger regional



EmX at station (© 2013 Lane Transit District).

economic opportunities via lakefront access – a commuter route already serving over 60,000 residents. It also connects to a mixed-income housing project. Route 18 in New Jersey also provided important connections to a major transit station that serves as a key service to the rest of New Jersey and the greater New York region.

Connect to Community Facilities and Assets

Not all trips and transportation demand are employment derived. In fact, the majority of trips are for other daily tasks like going to school or running errands. In Luray, Virginia, the Hawksbill Greenway connects the downtown and residential districts, but also serves as an important asset towards being a “walking community” with access to natural amenities and nearby historic attractions. The Duck Creek bridge in Oneida Nation, WI, provides schoolchildren a safer route through the restored bridge. Both the EmX BRT and Depot Avenue Multimodal Corridor connect communities to key educational opportunities – University of Oregon and University of Florida, respectively – and important medical facilities.

In other cases, the project itself becomes the community asset. Klyde Warren Park is a large central park in the middle of Dallas that was built on a freeway cap. The park offers bike trails, numerous gardens, a restaurant and café, water features, and many community events. The project also increased access to adjacent parcels that led to economic development.



The new Duck Creek Bridge and adjacent trails along SR 54 in Oneida (©Mead & Hunt).

Include More Users

The traveling public are the customers of transportation system providers. Community Connections projects attract more customers, particularly those who have been excluded from full use of the transportation system by creating attractive, vibrant, and multimodal facilities and services. A key element of the Complete Streets philosophy is to design systems for users of all ages and abilities. This approach accommodates not just individuals with disabilities, but addresses exclusionary barriers such as walking speed, English language literacy, or driver licensing. The ability to increase use of the transportation system can provide benefits ranging from the potential crime reductions by increasing eyes on the street to public and mental health benefits associated with increased physical activity and community engagement. The Planning and Environmental Linkages Report for the Federal Boulevard reconstruction project in Denver, CO noted that improved crosswalks across the busy street could improve accessibility for communities on either side of the road and would therefore improve community cohesion.

Reduced Project Delivery Delay

Project development and delivery timelines depend on the size and complexity of the project, and the degree that planning and permitting processes align with funding opportunities.

For many projects, developing stakeholder consensus is a significant component of the project development effort. Organized community opposition can create extensive project delays. Conversely, organized or grassroots projects support can streamline implementation. Early and continuous stakeholder involvement helps State and local project sponsors build community support for projects and identify significant impacts early in the planning and project development processes. This support can be fostered by a range of Community Connections tools including:

- Innovative public engagement tools that connect community constituents during the project development process to understand each other's concerns and find common ground.
- Procedural instruments such as Community Benefits Agreements or similar memoranda of understanding that demonstrate shared commitments to success.
- Consideration of pilot projects that demonstrate the anticipated benefits of a proposed action while reducing investment risk.

Increased Sense of Place for Communities

Community-oriented transportation strategies help create a sense of place. Transportation facilities can contribute to the identity of a neighborhood and communicate a collective sense of culture and history for both residents and visitors.

Incorporate Community Ideas and Assets

The use of innovative public engagement tools such as design charrettes and visualization techniques help ensure that transportation facilities reflect community values. The State Route 54 and Duck Creek Bridge project incorporated local artist designs that highlight valued elements of the Oneida Nation culture.



Artwork under the Duck Creek Bridge (©Mead & Hunt)

Create Welcoming Gateways

Context Sensitive Design reflects the relationship of the transportation facility to the community it serves. In many places, transportation projects serve as community gateways. The design of the facility can enhance the gateway experience. For example, the 41st Street Pedestrian and Bike Bridge provides a new connection for Bronzeville residents to connect to the Chicago lakeshore, and the project communicates this connective function with a bold visual design that encourages exploration.



41st Street Pedestrian and Bike Bridge (©City of Chicago)

Enhance Civic Presence

Transportation projects provide opportunities to enhance Community Connections by creating new commercial or civic space that can be a destination for the community in addition to serving as a means of mobility. The Target Field Station project improved access to an established multimodal hub and entertainment facility through thoughtful expansion of civic space.



Target Field Station (©Perkins Eastman)

3. MOVING FORWARD

The Community Connections Innovations Handbook is intended to both motivate and guide decision-makers to apply tools, strategies, and techniques in planning, project development, and design. The application of Community Connections can extend beyond the level of the individual project needs to encompass a broader, philosophical approach to integrating transportation with other elements needed for communities to thrive. This section discusses the institutional and cultural strengths, weaknesses, opportunities, and threats that galvanize transportation agencies, partner agencies, business and residential communities, and other advocacy and stakeholder groups to champion these innovations. Adoption of these strategies can turn transportation assets that disrupt communities into reinvestment opportunities that engage and connect communities.

Taking a comprehensive approach to incorporating Community Connections into existing projects and programs may seem daunting for practitioners and policymakers. Fortunately, agencies can take a stepwise approach. In a Metropolitan Planning Organization (MPO), good opportunities to apply Community Connections principles include the metropolitan transportation plans (MTP), congestion management plan updates, or a new corridor plan identified in the work program. In a State DOT planning office, opportunities include updating the statewide transportation plan, working on new policies, or initiating a small-town planning grant program. In a Federal Region or Division office, there may be planning workshops or existing interagency partnerships. For transit agency staff, opportunities for Community Connections approaches may include designing system or route expansions or working with local partners on transit-oriented development (TOD). In city or county government, Community Connections might be associated with starting a comprehensive or neighborhood plan, creating new street design guidelines, initiating a corridor plan, working on downtown revitalization, or reviewing land development proposals.

Regardless of agency or role, establishing Community Connections in transportation planning and implementation does not have to be complicated or intimidating. It could begin with an in-house meeting to review upcoming projects, discuss some of the examples in this Guidebook, or brainstorm potential ways to incorporate Community Connection principles and goals into an upcoming initiative. This can involve reaching out beyond regular activities to explore partnerships with people involved in land use planning, housing and community development, resource preservation, or transportation operations. One could also decide to modify an existing project or program, initiate a new venture, or join and support one that is being led by a partner agency.

The following pages describe some initial steps to foster Community Connections within daily activities. The five concepts described in this chapter focus on identifying opportunities, cultivating champions, institutionalizing concepts, applying the principles and concepts at all phases of project development, and partnering with FHWA.

Identifying Community Connections Opportunities

A logical place to begin using the Community Connections tools described in this handbook is to look for opportunities within current planning work programs. This could be done as part of the advancement for individual projects already underway or with a scan of all the programs or projects within the work program.

A strengths, weaknesses, opportunities, and threats (SWOT) Analysis is a useful first step. It is a structured process that focuses on an agency's foundational or competitive position – essentially to assess and determine where an agency is strong or weak and what new opportunities or threats the agency may be facing. A SWOT analysis can help a planning team consider how applying the Community Connections concepts and tools may represent a formalization of activities already being undertaken, a refinement of current activities, or a brand-new approach to transportation systems implementation or operations. This process will help identify the balance of actions that will be most successful given a particular physical, cultural, and institutional environment. Think of these also in the context of the Community Connections project goals.

Community Connections project goals:

- Engage communities more effectively.
- Improve multimodal access.
- Revitalize communities or enhance economic competitiveness.
- Deliver successful projects.

Cultivating Community Connections Champions

Integrating successful community initiatives within a transportation agency program or project is best fostered when there are champions both within the transportation agency and within the local community. Community Connections solutions require input and engagement from a wide range of agencies and interests. Reaching out to local planners, economic development groups, housing agencies, public health agencies, disability rights organizations, resource agencies, emergency management, businesses, landowners, and other community groups is an important step in developing effective, integrated solutions. Coupled with the strength and commitment of the EDC network and the State Technology Innovation Councils, this can create a larger group of champions. PlanWorks has several tools that can help foster these collaborations, including the stakeholder [collaboration assessment](#) tool that can assist in identifying new champions or new ways of communicating about collaboration.

The screenshot shows the PlanWorks website interface for the Stakeholder Collaboration Assessment. The page title is 'Stakeholder Collaboration'. Below the title, there is a brief instruction: 'Please respond to the following statements based on your current situation. The assessment takes only a few minutes, and you can skip any section. Once finished, click View Result tab to see the summary report with your results and all strategies are available there. You may also take the assessment off-line as an individual or as a group. The Assessment Statements (PDF) and Supporting Strategies (PDF) provide you with all information in a printable format.' Below this, there are two tabs: 'Assessment' and 'View Result'. The 'Assessment' tab is active, showing a table with four statements and six response options: 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree', 'Strongly Agree', and 'N/A'. Each statement has a radio button corresponding to one of the response options.

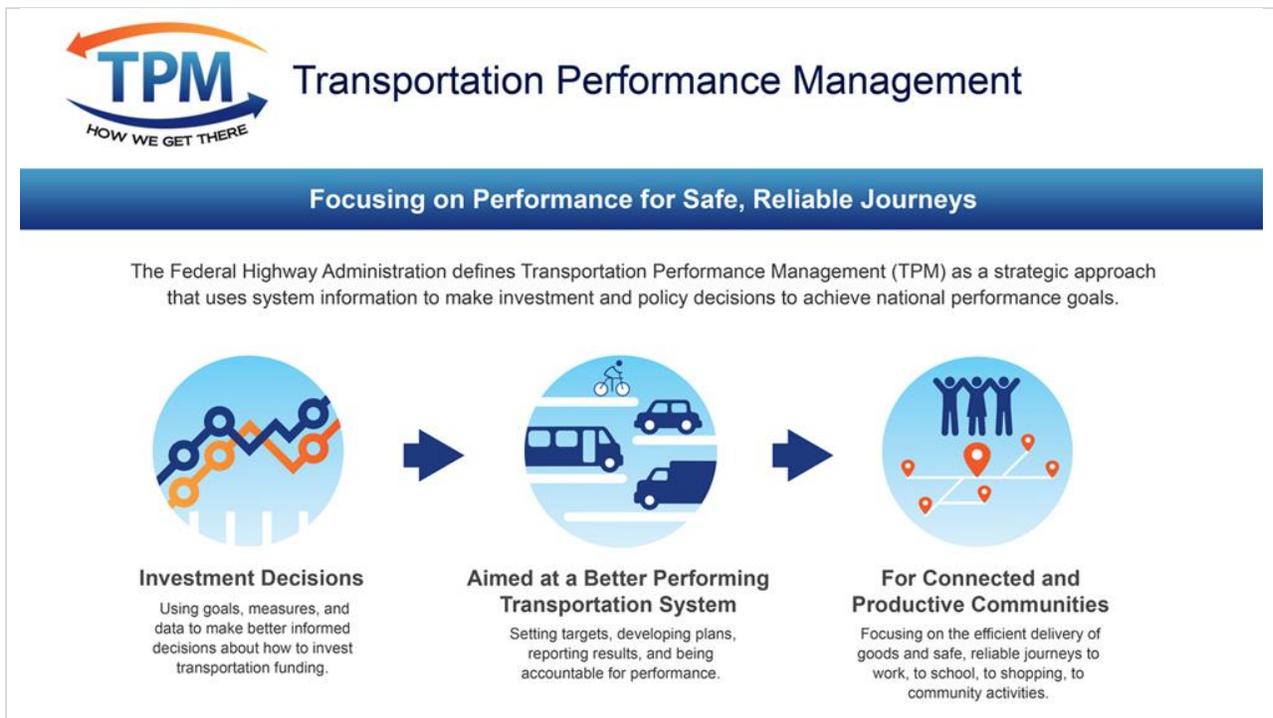
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A
I am able to clearly articulate key messages with decision makers.	<input type="radio"/>					
I am able to communicate the appropriate messages at the appropriate times and to the appropriate people.	<input type="radio"/>					
I understand the process required to communicate my message.	<input type="radio"/>					
I have ample opportunity to make my voice heard.	<input type="radio"/>					

PlanWorks' Stakeholder Collaboration Assessment (Source: FHWA²).

² <https://fhwaapps.fhwa.dot.gov/planworks/Assessment/StakeholderCollaboration>

Institutionalizing Community Connections

The tools described throughout this handbook are most readily applied when all agency members are familiar with them and standardize them in existing practices. The concepts described in the FHWA [Transportation Performance Management \(TPM\)](#) Toolbox chapter on organization and culture include leadership team support, roles and responsibilities, training and workforce capacity, and management process integration. These concepts provide a useful guide for agencies to foster a culture that embraces and implements successful Community Connections. The TPM Toolbox chapter on organization and culture refer to the institutionalization of a transportation performance management approach within the organization, as evidenced by leadership support, employee buy-in, and embedded organizational structures and processes. This same approach can be used in conjunction with Community Connections.

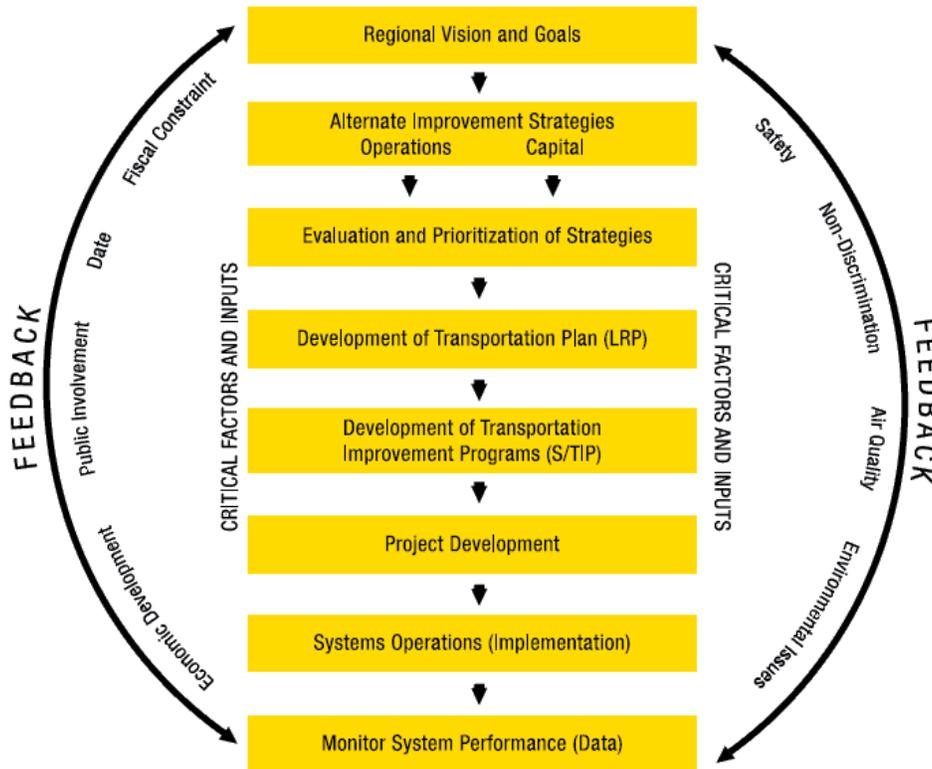


TPM's Strategic Approach for Connected Communities (Source: FHWA³).

³ <https://www.fhwa.dot.gov/tpm/>

Applying Community Connections Across All Phases of a Project Life Cycle

The process of considering means to connect communities – physically, economically, or culturally – can occur at all phases throughout the transportation decision-making process and at all stages of a project or program’s life cycle. The identification of community assets and needs, for both current and forecast conditions, should inform the development of long-range transportation plans, transportation improvement programs, projects, and system operations.



Transportation planning process (Source: FHWA⁴).

Community Connections and the Planning and Project Development Process

Strategies for incorporating Community Connections throughout the transportation decision-making process can include elements that meet each of the five Guiding Principles:

⁴ <https://www.planning.dot.gov/documents/GuidetoTransportationDecisionmaking.pdf>

Guiding Principles	Strategies for Implementation
Envision and plan with the community to understand their transportation needs.	<ul style="list-style-type: none"> • Incorporate innovative public outreach strategies to engage diverse participants in the transportation decision-making process. • Create compelling documentation that includes words, maps, pictures and numbers to describe how plans and projects support community connectivity. • Use community connectivity objectives to inform project prioritization and funding.
Approach projects holistically to consider all opportunities small or large, to improve communities through better transportation that leads to other desired community outcomes.	<ul style="list-style-type: none"> • Identify performance measures to incorporate connectivity, accessibility, transportation choices, housing, health, economy and environment in terms relevant to stakeholders. • Coordinate Transportation Improvement Program (TIP) and Capital Improvement Program updates with land use plans and private development projects, and economic development plans such as Comprehensive Economic Development Strategies (CEDS). • Update project programming documents to reflect the rationale and justification of the project need relative to community connectivity objectives.
Consider the needs, security, and safety of all transportation system users.	<ul style="list-style-type: none"> • Incorporate design elements such as Complete Streets, context sensitive approaches, sustainable roadway design, and other best practices. • Revisit local and State transportation funding policies to assess how well they support community connectivity objectives. • Reevaluate legacy projects against community connectivity objectives.
Build collaborative partnerships with traditional and nontraditional partners (e.g., interagency, multidisciplinary, State-local, public-private).	<ul style="list-style-type: none"> • Engage partners from housing, community and economic development, health, and environmental sectors throughout the transportation decision-making process. • Encourage overlap in transportation design development and review with multiple partners such as utility providers, transit operators, housing developers, recreation infrastructure providers, councils on aging, health practitioners, and other stakeholders. • Bundle multiple place-based projects that support community connectivity to streamline design and construction, reduce costs, ease project backlogs, and pursue major grant opportunities.
Embrace innovation, technology, flexibility, creativity, and multimodal approaches to address each community's unique challenges, especially those that are performance-based.	<ul style="list-style-type: none"> • Foster community visions and plans that are supported by specific objectives for community connectivity. • Use new technical approaches to identify and evaluate integrated alternatives that include the full range of multimodal options, land use and urban design, and management and operational strategies to address travel demand. • Track system performance against connectivity indicators across multiple time horizons and regularly publish this information targeted to the general public and decision-makers.

Partnering with FHWA on Community Connections

Transportation planning and systems management is an ongoing, iterative process involving multiple agencies and interested stakeholders. The Community Connections Toolbox is designed to provide concepts and resources to transportation planners and engineers at state and local agencies who are most directly responsible for system implementation and operations. FHWA stands ready to provide different levels and types of capacity-building support from both its Headquarters Offices and Division Offices. These capacity building programs include the [FHWA Resource Center](#), [NHI training opportunities](#), and the [Transportation Planning Capacity Building Program](#). In addition, USDOT has many formula and discretionary funding opportunities including:

Federal-aid Highway Program	USDOT Discretionary Programs
<ul style="list-style-type: none"> • National Highway Performance Program (NHPP). • Surface Transportation Block Grant Program (STBG). • Highway Safety Improvement Program (HSIP). • Railway-Highway Crossings Program (RHCP). • National Highway Freight Program (NHFP). • Congestion Mitigation & Air Quality Improvement Program (CMAQ). • Metropolitan Planning (PL). • State Planning and Research (SPR). 	<ul style="list-style-type: none"> • Better Utilizing Investments to Leverage Development (BUILD). • Infrastructure for Rebuilding America (INFRA). • Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD). • Accelerated Innovation Deployment (AID). • State Transportation Innovation Council (STIC) Incentive Program.

Leveraging the Every Day Counts Program

FHWA’s Every Day Counts (EDC) program is a State-based model that identifies and rapidly deploys proven yet underutilized innovations to shorten the project delivery process, enhance roadway safety, reduce traffic congestion, and improve environmental sustainability. Proven innovations promoted through EDC facilitate greater efficiency at the State and local levels, saving time, money and resources that can be used to deliver more projects.

FHWA works with State DOTs, MPOs, local and tribal governments, private industry and other stakeholders to identify a new collection of innovations to champion every two years that merit accelerated deployment. Key components to the success of innovation deployment programs such as EDC are the State-based approach and the State Transportation Innovation Council (STIC) concept. A STIC or other equivalent task force, committee or group is intended to bring together public and private transportation stakeholders to evaluate innovations and spearhead their deployment in each State. The STIC or an equivalent group puts the highway community in each State in the driver’s seat to comprehensively and strategically consider sources of innovation, select those innovations that best fit its unique program needs, and then quickly put those innovations into practice.

The EDC program has made a significant positive impact in accelerating the deployment of innovations and in building a culture of innovation within the transportation community. Since the inception of EDC, each state has used 14 or more of the 43 innovations promoted through Every Day Counts, and some states have adopted more than 30. Many of these innovations have become mainstream practices across the country. By advancing 21st century solutions, the transportation community is making every day count to ensure our roads and bridges are built better, faster, and smarter.

Community Connections is one of these innovations, but there are several others to note that also support Community Connections, including:

- [EDC-1](#) – adaptive signal control technology, clarifying the scope of preliminary design, enhanced technical assistance with ongoing environmental impact statements, flexibilities in ROW, flexibilities in utility accommodation and relocation, planning and environmental linkages, use of in-lieu fee and mitigation banking.
- [EDC-2](#) – alternative technical concepts, design-build, geospatial data collaboration, intersection and interchange geometrics, locally administered Federal-aid projects, and programmatic agreements.
- [EDC-3](#) – 3-D engineered models for construction, stakeholder partnering, regional models of cooperation, and road diets.
- [EDC-4](#) – Community Connections, data-driven safety analysis, and using data to improve traffic incident management.
- [EDC-5](#) – collaborative hydraulics, project bundling, reducing rural roadway departures, safe transportation for every pedestrian (STEP), unmanned aerial systems, use of crowdsources to advance operations, value capture, and virtual public involvement.

More information on EDC and a wealth of EDC resources are available at:
<https://www.fhwa.dot.gov/innovation/everydaycounts/>

COMMUNITY CONNECTIONS TOOLBOX

Community Connections projects can be found throughout the country in a variety of contexts. These projects have been implemented through a variety of collaborations. They can be large mega-projects, ad hoc solutions, or elements of transportation system management and operations. What makes these projects similar is that they expand multimodal connections, engage stakeholders more effectively, help communities revitalize or improve economic competitiveness, and improve transportation project delivery. This toolbox shows practitioners and other interested parties how existing transportation tools can be used to support Community Connections outcomes. These outcomes are not just about learning to use new tools – they are about using all tools in new ways to advance community visions more effectively and efficiently within transportation planning and project delivery.

Community Connections Toolbox tools are organized into the following four categories:

- **Analytical Tools and Planning Frameworks (AP)** are approaches that help to identify project visions, parameters, or approaches.
- **Public Involvement Strategies (PI)** are best practices in planning to help implement a community's vision. These strategies help practitioners engage with the community to make community members an integral part of the transportation process, effectively encouraging a sense of pride and ownership within the transportation process.
- **Planning and Design Techniques (PD)** are project-level approaches that help improve physical Community Connections.
- **Operational Improvements and Programs (OI)** are approaches that focus on particular modal service improvements that can be implemented through individual projects or systematic programs. These tools help to incrementally improve transportation operations in a variety of contexts, including service, access, and accommodations.

Elements of Each Tool

Each tool is examined in detail in the following pages and include the following elements:

- A brief summary of the tool.
- An informational text box describing the tool's primary target audiences (i.e., agencies and professional disciplines), estimated time and fiscal commitments, and when the tool can be applied within the planning, project development, and design processes.
- A summary of key benefits of using the tool.
- Examples of where and how the tool has recently been used to connect communities.
- Links to available resources (e.g., guidebooks, research, tools, technical assistance, and training).

The informational text box summarizing tool applicability allows the reader to get a sense of the tool's applicability at a glance. Each of the tool text boxes contains concise descriptions that are explained further below. Additionally, this section contains a cross-reference table that demonstrates the various transportation decision-making phases when each Community Connections tool or strategy can be implemented and the level of effort associated with each tool.

Who Can Lead?

This term describes the types of practitioners who will most likely be able and interested in leveraging the benefits of each tool. The following roles are considered:

- **Elected officials** – individuals who hold office through the outcome of an election.
- **Local or tribal government staff** – individuals that work for a city, county, town, or tribe with its own government.
- **Planners** – professionals who develop plans, programs, and policies to shape communities, accommodate and direct growth, and revitalize towns, cities, and regions.
- **Designers** – professionals who design and shape the physical features and settings of towns, cities, and regions.
- **Engineers** – professionals who deal with the design, construction, and maintenance of the built environment.
- **Operators** – professionals that operate transportation system or service, such as traffic signal systems or transit services.
- **Researchers** – professionals that perform academic or scientific research in a variety of disciplines.
- **Program managers** – professionals who manage several related projects to improve overall performance.
- **Modal administrators** – transportation professionals who oversee agency programs for individual modes (e.g., freight, public transportation).
- **Public involvement specialists** – professionals who inform and engage audiences around an issue or situation.
- **Environmental specialists** – professionals who perform environmental studies, and ensure Federal, State, and local environmental regulations are followed.
- **Health professionals** – professionals who work in various branches of healthcare.
- **Community advocates/groups** – individuals and groups who help engage a constituency with geographic or functional objectives (e.g., a homeowner’s organization, an environmental interest group) about transportation decisions.

How Difficult?

Each dollar sign indicates the difficulty and cost of implementing a tool or strategy, starting with minimal effort and leading into a substantial addition to an agency’s program and staff skill sets.

- \$\$\$\$ - can be integrated into current processes with minimal effort.
- \$\$\$\$ - may require minor staff training or a new product to implement.
- \$\$\$\$ - most likely a freestanding project or initiative.
- \$\$\$\$ - substantial addition requiring consideration of separate funding or staff training for most effective results.

Level of Effort:

This term refers to the number of hours it might be expected to take to implement a tool or strategy, ranging from under 500 hours to more than 2500 hours.

- Low – under 500 hours to implement.
- Moderate – 500-2500 hours to implement.

- High – 2500+ hours.

When?

This description refers to the various phases of the transportation planning, project development, and design processes during which a tool or strategy can be implemented. Depending on the tool and timing, multiple phases might be involved.

- **Planning** – establishes the direction of investment in the transportation system and identifies how to address implementation.
- **Scoping** – develops and evaluates alternatives.
- **Project Development** – executes the series of steps a transportation project must undertake as it goes from plan to implementation.
- **Design** – determines the layout of projects and design details.
- **Preliminary Engineering** – conducts analysis and design work to produce construction plans, specifications, and cost estimates.
- **NEPA** – documents project-level decisions per the National Environmental Policy Act, a U.S. environmental law that requires federal agencies to prepare environmental assessments (EAs) and environmental impact statements (EISs), and categorical exclusions (CEs) which state the potential environmental effects of proposed actions.
- **Construction/Reconstruction** – implements a new transportation project or significant changes to functionally obsolete projects.
- **System Operations** – optimizes the safe, efficient, and reliable use of existing and planned transportation infrastructure for all modes.
- **Maintenance** – preserves and repairs the transportation system to optimize mobility.
- **As needed** – certain tools are applicable across all phases and should be applied as appropriate to the needs of each phase.

The table on the following page demonstrates the various phases of transportation planning, project development, and design phases during which a tool or strategy can be implemented and the level of effort associated with each tool or strategy.

	Planning	Scoping	Project Development	Design	Preliminary Engineering	NEPA	Construction	System Operations	Maintenance	As Needed	Level of Effort
Analytical Tools and Planning Frameworks (AP)											
AP- 1: Bicycle & Pedestrian Assessments										x	Low
AP-2: Community Impact Assessments	x	x	x			x	x	x			Low - Moderate
AP-3: EconWorks	x	x	x								Low
AP-4: Environmental Justice Analyses	x	x	x			x	x	x			Low
AP-5: GIS Innovations	x		x	x				x			Low
AP-6: Health in Transportation	x	x	x	x		x					Low
AP-7: Planning and Environmental Linkages	x	x	x	x	x	x					Low
AP-8: PlanWorks									x		Low
AP-9: Road Safety Audits	x	x	x					x	x		Low
AP-10: Scenario Planning	x	x	x	x	x			x			Low - High
Public Involvement Strategies (PI)											
PI-1: Design Charrettes	x		x	x							Low
PI-2: Experiential Public Engagement	x	x	x				x				Low
PI-3: Stakeholder Engagement	x	x	x				x				Low
PI-4: Virtual Public Engagement	x	x		x							Low
PI-5: Visualization Techniques	x		x	x					x		Moderate
Planning and Design Techniques (PD)											
PD-1: Community Benefits Agreements	x		x								Low
PD-2: Complete Streets	x		x	x							Moderate - High
PD-3: Context Sensitive Solutions									x		Low - Moderate
PD-4: Performance-Based Practical Design	x	x	x	x							Low
PD-5: Road Diets	x		x	x							Low
Operational Improvements and Programs (OI)											
OI-1: Expanded Access to Transit										x	Low - Moderate
OI-2: Freight First-Mile/Last-Mile										x	Moderate - High
OI-3: Improved Transit Service										x	Moderate - High
OI-4: Pilot Projects										x	Low
OI-5: Shared Mobility Services										x	Low
OI-6: Transit User Accommodations										x	Low - Moderate

ANALYTICAL TOOLS AND PLANNING FRAMEWORKS

AP-1: Bicycle and Pedestrian Assessments	35
AP-2 Community Impact Assessments.....	37
AP-3: EconWorks	39
AP-4: Environmental Justice/Equity Analyses.....	41
AP-5: Geographic Information Systems (GIS) Innovations	43
AP-6: Health in Transportation.	45
AP-7: Planning and Environmental Linkages.....	47
AP-8: PlanWorks	49
AP-9: Road Safety Audits.....	51
AP-10: Scenario Planning.....	53

AP-1 Multidisciplinary teams use bicycle and pedestrian assessments to improve bike and pedestrian safety.

What is a Bicycle and Pedestrian Assessment?

A Bicycle and Pedestrian Assessment is an on-the-ground examination of bicycle and pedestrian facilities led by multidisciplinary, multi-agency teams. They review physical design, enforcement problems, and policy decisions in areas with recognized or perceived bicycle and pedestrian safety and access issues in a variety of situations and locations.

Well-connected, safe bicycle and pedestrian travel can boost vital community outcomes: reduction of toxic emissions and air pollution, improved health through prevention, increased access to opportunity, and relief of roadway congestion. In 2015, the USDOT led a demonstration project to inspire States, MPOs, local governments, and others to lead their own assessments and identified the following proposed steps for hosting successful road safety assessments:

1. **Identify roles and partners:** Consider the roles of key staff and partners early on and identify existing initiatives/funding to leverage (where applicable).
2. **Plan the event:** Pick a location (for example, a transit area station) with identified safety problems that involve a variety of stakeholders. Choose audience-appropriate assessment tools.
3. **Invite attendees:** Reach out to stakeholders and practitioners at all levels, including those that are not traditionally involved in pedestrian and bicycle safety issues. Participants could include pedestrian and bicycle advocacy groups, elected officials, special interest groups, law enforcement, the general public, and other interested parties. Consider those that have the resources, influence, and motivation to participate in the assessment.
4. **Conduct the event:** Convene an event to present background information on the assessment location, review the assessment tool, conduct the assessment, and debrief with participants afterwards to discuss next steps.

Many participants in this demonstration project stated that looking at site level issues was useful, but that it was also beneficial to establish more collaborative relationships between various agencies that can be leveraged in future projects.

Who Can Lead?

Planners, Designers, Engineers, Operators, Researchers, Public involvement specialists, Health professionals, and Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? As needed



Team performs on-the-ground assessment of bicycle and pedestrian facilities (Source: FHWA⁵).

⁵ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/resources/assessments/assessments.pdf

What are the Potential Benefits?

- **Improved safety** – helps to identify and recommend solutions to physical and policy barriers to safe bicycling, walking, and bike/walk access to transit stations.
- **Enhanced relationship-building** – facilitates and encourages partnerships between people who work at various agencies/levels and helps to gather information directly from stakeholders about their experiences with facilities while in the field.
- **Low cost** – can be informal and simple.
- **Training and education opportunity** – can include information on engineering improvements, data, funding, and policy opportunities during or after the assessment.

How Have Others Connected Their Communities?

Using a new road design as a catalyst for promoting safety – In November 2014, FHWA assessed a recent road diet in Des Moines, Iowa that reduced the lanes of a highway segment from four to three and added a bicycle lane. With local partners, FHWA concluded that a “share the road” campaign could educate both drivers and bicyclists on how to operate safely on the road together.

Improving bicycle and pedestrian counts to demonstrate success – Many agencies have an incomplete picture of the use and demand for walking and biking facilities. In May 2015, FHWA found that good pedestrian count data in Kent County, Delaware could help them build public and political support for projects focused on pedestrian access and safety.

Connecting analytics to larger community goals and funding – In April 2015 in El Dorado, Arkansas, the City Council held a community visioning meeting to discuss the vision for a corridor that a bicycle and pedestrian assessment had occurred in. The area would have a new regional arts center, drawing 5,000 to 7,000 visitors per year. The team presented the results of an assessment that described the necessary pedestrian and bicycle improvements in the area. After discussing these needs, the City Council approved funding for a Master Pedestrian and Biking Trail Plan.

How Can I Get Started?

[US Department of Transportation: Pedestrian and Bicyclist Road Safety Assessments](#)

[Safer People, Safer Streets: Pedestrian and Bicycle Safety Initiative](#)

[Pedestrian and Bicycle Information Resource Center's Planning and Data Collection Tools](#)

AP-2 Community impact assessments identify effects of a transportation action on a community and its quality of life.

What is a Community Impact Assessment?

A community impact assessment (CIA) is an iterative process to evaluate the effects of a transportation action on a community and its quality of life. The CIA process is an integral part of transportation planning and project development that shapes the outcome of transportation decisions. It involves understanding the needs and concerns of communities and documenting the existing and anticipated social environment of a community with and without the proposed action. The information gleaned from this iterative process can inform decisions concerning transportation planning, project alternatives, design, and implementation.

The CIA process should include all items of importance to people, such as mobility, safety, employment effects, relocation, isolation, and other community issues.

The primary steps of this scalable and iterative process include defining the need and action, identifying community characteristics, analyzing impacts, identifying solutions, and documentation of findings. The diagram below provides an overview of the assessment process and the actions and inputs required at each phase.

Who Can Lead? Elected officials, Local or tribal government staff, Planners, Engineers, Program Managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$
Low to medium level of effort

When? Planning, Scoping, Project development, NEPA, Construction/Reconstruction, System operations

Community Impact Assessment Process



The Community Impact Assessment Process (Source: FHWA⁶).

⁶ https://www.fhwa.dot.gov/livability/cia/quick_reference/index.cfm

What are the Potential Benefits?

- **Greater livability** – promotes community values more effectively and contributes to economic growth and well-being.
- **Responsive decision-making and streamlined delivery** – ensures that actions support desired community goals that may in turn reduce project delivery delays and minimize potential conflicts.
- **Nondiscrimination** – alerts decision-makers to the potential for disproportionately high and adverse effects.

How Have Others Connected Their Communities?

The **I-70/I-71 Columbus Crossroads** project (Columbus, Ohio) emerged from a series of planning and environmental studies seeking to address that corridors' deteriorating safety and mobility. During the environmental assessment, the Ohio Department of Transportation (ODOT) assessed demographic characteristics and other community characteristics. These factors were important to ODOT as the department worked to avoid and minimize impacts per environmental justice guidelines. Further, ODOT provided active public involvement opportunities to educate and receive valuable input from stakeholders. By conducting robust public involvement activities through multiple phases of project development, ODOT was able to obtain and integrate local concerns and needs throughout the planning and design phases.

Stakeholder feedback was reflected in the development of conceptual alternatives that reconnected the neighborhoods divided by the construction of the original I-70/I-71 interstate. Additionally, community input informed the development of thoughtful alternatives and provided for a series of design enhancements that improved safety and visual aesthetics in the corridor. Ultimately, ODOT's involvement of a full spectrum of stakeholders throughout the project development lifecycle allowed the agency to realize many of the project's primary objectives with minimal environmental and community impacts.



The I-70/I-71 Long Street Bridge pictured before (top) and after (bottom) improvements; Ohio DOT used CIA to improve project outcomes (Photos: ©MKSK Studios).

How Can I Get Started?

[FHWA Community Impact Assessment: A Quick Reference for Transportation](#)
[FHWA Community Impact Assessment: Examples of Best Practices](#)

AP-3 EconWorks estimates the economic impacts of potential projects, helping to improve local competitiveness.

What is EconWorks?

EconWorks is a collection of web-based tools designed to help planners incorporate economic analysis into early project decision-making, including a library of case studies, a project assessment, and a larger economic benefits analysis tool.⁷ As an active site, it continues to update and evolve its offerings; for example, the database of case studies continues to be updated as practitioners use tools and share information. A 2017 monthly webinar series was recorded and remains available online to help practitioners use the tools and case studies, including these specific trainings:



- Case Study Development Training – 13 modules 10-20 minutes each provide transportation practitioners and planners with the necessary skills to accurately assess the observed economic impacts of transportation projects. The course provides step-by-step guidance for analyzing and integrating a range of information sources in order to add new cases to the EconWorks Case Studies database.
- Economic Analysis in Transportation Planning Training – 75-minute course provides guidance on how to apply economic analysis in the transportation planning process. The primary audience is the practicing planner working for a public agency or private firm who is familiar with planning and project development, but not trained in economics. It includes the following:
 - The basics of economic analysis.
 - An overview of how economic analysis fits within and is applied to long-range planning, programming, corridor planning, and environmental review.
 - Survey of existing economic analysis methods (benefit-cost analysis, economic impact analysis, multi-criteria analysis) and types of benefits (user, non-user, community, and wider economic benefits).
 - An explanation of economic analysis tools and their applicability to economic analysis methods, and practical examples of how the tools can be used through each stage of the planning process.
 - Ways to effectively communicate and present economic analysis results to various non-technical audiences.

Who Can Lead?

Planners, Designers, Researchers, Program managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$
and low level of effort

When? Planning, Scoping, Project development

As resources are developed, they are captured in this clearinghouse:
<https://planningtools.transportation.org/732/resources.html>

⁷ <https://planningtools.transportation.org/13/econworks.html>

What are the Potential Benefits?

- **Stronger understanding of project level economic impacts** - improve public and transportation agency understanding of the range of economic impacts that occur from various types of highway projects.
- **Improved project selection** - define the broad range of impacts and factors affecting projects and refine public debate about highway projects by establishing boundaries of the likely positive and negative impacts that typically occur from such projects.

How Have Others Connected Their Communities?

Selecting the best project alternative – In Navajo County, AZ, the Arizona DOT established that one project alternative had the lower overall cost and higher benefit-cost ratio than the other alternative. The benefit-cost ratio was determined by monetizing specific road safety benefits, such as the reduction in crashes and the reduction in the severity of crashes.

Assessing new jobs during construction – As part of its planning process and TIGER application, the Chicago DOT [determined that the project would create 140 construction jobs](#) for the 41st street pedestrian and bike bridge in the environmental justice community where the facility will be located.

Quantifying the larger economic and community impact of a project – In Dallas, TX, Klyde Warren Park (a highway cap project turned urban park) has impacted the surrounding area. Since opening in 2012, nearby lease rates have increased dramatically; some as high as \$52 per square foot. It is projected to generate \$312.7 million in economic development and \$12.7 million in tax revenue. This new development will contribute to a projected 8.8 percent population increase nearby and to a 61 percent increase in ridership on the M-Line trolley that connects downtown and uptown.

How Can I Get Started?

[EconWorks](#)

AP-4 Environmental Justice/Equity Analyses ensure full and fair participation within transportation decision-making.

What are Environmental Justice/Equity Analyses?

Environmental Justice (EJ)/Equity Analyses are comprehensive assessments to identify and address disproportionately high and adverse effects of a transportation action on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens. In accordance with the 1994 Executive Order 12898 on Environmental Justice, all transportation agencies are required to examine how a plan, project, or policy will affect low-income and minority populations.⁸ Some agencies broaden their analyses to consider the equity of impacts across a variety of vulnerable populations, such as older adults, children, and people with disabilities.

To conduct a complete analysis, practitioners should conduct quantitative assessments and public engagement to complete the following steps:

1. Identify the types and locations of populations to consider.
2. Identify the needs and concerns of the selected populations.
3. Assess the potential benefits and burdens of plans, programs, and projects.
4. Determine any disparate impacts.
5. Deploy strategies to address imbalances and needs.

Examples of **burdens** include adverse employment effects, decline in tax base or property values, displacements, increased noise and/or emissions, decreased aesthetics, disruption to businesses, reduced access to job and educational opportunities and nearby services, and disruption of community cohesion (e.g., access to schools, parks, religious centers). Potential **benefits** include reduced travel times, improved multimodal accessibility, reduced congestion, improved safety, more productive economic development, and improved community revitalization.

What are the Potential Benefits?

- **Full and fair participation** – assures that all segments of the population, including low-income and minority populations, receive equal opportunity in the transportation development process.

Who Can Lead? Elected officials, Local or tribal government staff, Planners, Operators, Researchers, Program managers, Modal administrators, Public involvement specialists, Environmental specialists, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and low level of effort

When? Planning, Scoping, Project Development, NEPA, Construction/Reconstruction, System Operations

⁸ <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>

- **Reduction of high and adverse effects** – avoids, minimizes, or mitigates disproportionately high and adverse health and environmental effects on minority and low-income populations.
- **Receipt of benefits** – prevents denial, reduction, or delay in the receipt of benefits by minority or low-income populations.⁹

How Have Others Connected Their Communities?

Environmental Justice Analysis on the S.R. 412 corridor – In the City of Bethlehem, Pennsylvania, the S.R. 412 corridor was upgraded, widened, and modernized to improve transportation safety and mobility and to complement the planned economic development through congestion reduction. PennDOT and FHWA determined that there were several populations substantially above the statewide, county, and city averages for both Hispanic and low-income persons. This was determined through examination of Census data, field reviews, and discussions with local stakeholders. To engage Environmental Justice (EJ) populations, the project team incorporated several outreach tools and strategies, including the following:

- The Community Advisory Committee (CAC) established for the project was expanded to include Latino representatives.
- Public involvement documents, such as newsletters, flyers, meeting handouts, and advertisements were translated into Spanish and distributed to local Spanish-language newspapers, local neighborhood organizations, business, clubs, and churches.
- A Spanish-speaking interpreter was involved with public meetings.

Even with these outreach efforts, participation from the Latino community was low. To combat this, the project team presented at the Puerto Rican Beneficial Society Club, which resulted in good attendance and positive feedback from the community. The community members explained that it was culturally significant that the mayor and project team stayed to socialize after their presentation. Overall, the lessons learned included inviting EJ populations to have representation on CACs, being conscious of community preferences for meeting locations, and being aware of cultural/ethnic customs of EJ communities. Overall, these decisions helped to contribute to a better decision-making process for the project and the community.¹⁰

How Can I Get Started?

[FHWA Environmental Justice and FHWA EJ Reference Guide](#)

[PolicyLink](#)

[EPA's Environmental Justice resources](#)

[U.S. HUD EJ Resources](#)

[USDOT's Equity Portal](#)

[Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transportation Planning](#)

[Creating Equitable, Healthy, and Sustainable Communities: Strategies for Advancing Smart Growth, Environmental Justice, and Equitable Development](#)

⁹https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/fhwahep15035..pdf

¹⁰ <http://www.dot.state.pa.us/public/pubsforms/Publications/Pub%20746.pdf>

AP-5 GIS Innovations help communities identify ways to improve effective connections.

What are GIS Innovations?

Geographic Information Systems (GIS) allows users to display, analyze, and manipulate spatial data to support decisions, inform allocation of resources, and aid in the advancement of projects that further an agency's mission. GIS Innovations can also support Community Connections through the application of data from readily available sources to identify populations of interest and their daily trips and activities.

GIS innovations have become particularly robust in recent years due to the proliferation of "big data" on both spatial detail regarding origins (such as census data on population and household characteristics), destinations (such as businesses or community services), and travel trends from devices such as vehicles and cellphones that continuously broadcast location data. Applications in other transportation-related fields have also emerged. For example, a variety of mobile applications have emerged that demonstrate the quickest path between two points via multiple modal options.

The USDOT maintains a [website](#) of GIS tools and resources for data and continuing education and collaboration that includes links to other organizations:

- The Urban and Regional Information Systems Association (URISA), a nonprofit association of professionals using GIS and other information technologies to solve challenges in all state and local government agencies and departments.
- The GIS Standing Committee (ABJ60) of the Transportation Research Board of the National Academy of Sciences provide peer-reviewed papers and presentations regarding innovative uses of GIS for transportation analysis from agencies around the globe.
- The Environmental Protection Agency provides data resources for smart growth and smart location planning to integrate land use and transportation data on a common platform nationwide.
- The Open Geospatial Consortium is an international industry group of over 518 companies, government agencies and universities participating in a consensus process to develop publicly available interface standards for GIS data across all technical disciplines.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Operators, Researchers, Program Managers, Modal administrators, Public involvement specialists, Environmental specialists, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? Planning, Project Development, Design, System Operations

Sound GIS analyses rely on trusted information sources. GIS innovations may be developed through publicly-sourced data (including Federal agencies such as the U.S. Census or U.S. Geological Services), public sources (e.g. General Transit Feed Specification (GTFS)), third-party sources that either acquire data (InfoUSA and HERE are two examples among many) or serve as vendors of end-products (Streetlight and Walkscore another two examples among many). Key questions to consider in developing a GIS innovation include:

- Whether the application will be used just once for a given project or maintained for repeated, systematic applications.
- Whether accurate and authoritative data sources are better developed in house or obtained from vendors.
- How metadata explaining the data sources will be documented and maintained, if needed.

What are the Potential Benefits?

- **Promote robust analysis** – integration of data with compelling visuals can inform brainstorming and facilitate problem solving by project staff and with community stakeholders.
- **Accelerate project delivery** – the combination of analytic and communications power can help garner constituent support around a preferred solution, streamlining the decision-making process.

How Have Others Connected Their Communities?

Using GIS as a foundational tool for project selection – Virginia DOT is using GIS to prioritize candidate project selection in their Smart Scale program, considering which projects increase access to jobs for traditionally underserved populations. The integration of HERE and GTFS data for travel with US Census land use data helps show not only where new projects increase connectivity or otherwise reduce travel time, but how many new potential origins and destinations are connected.

Visualizing new connections – During project planning, Rhode Island DOT faced a challenge in untangling the Route 6/10 interchange in downtown Providence, where a complex legacy freeway connection left some neighborhoods suffering cut-through traffic and others cut off from the street grid. To help develop and build support for the recommended alternative, Rhode Island DOT used GIS tools to demonstrate how this alternative would increase access to destinations by walking or driving for residents in adjacent communities. This alternative is currently in the design-build phase.

How Can I Get Started?

[FHWA GIS Resources](#)

[Urban and Regional Information Systems Association \(URISA\)](#)

[TRB GIS Committee \(ABJ60\)](#)

AP-6 Health in Transportation integrates public health considerations into transportation processes.

What is Health in Transportation?

Health in Transportation refers to FWHA's "Framework for Better Integrating Health into Transportation Corridor Planning," which provides step-by-step tools to better incorporate public health into existing transportation processes including project development. This framework is integral because transportation decisions shape community health outcomes. The Framework is intended for transportation professionals, with health professionals as partners, and focuses on community needs.

The Framework contains the following steps:

- **Step 1:** Define transportation problems and public health issues.
- **Step 2:** Identify transportation and health needs, resources, and priorities.
- **Step 3:** Develop goals and objectives that promote health in the community.
- **Step 4:** Establish evaluation criteria that include public health.
- **Step 5:** Develop and evaluate alternatives and their health impacts.
- **Step 6:** Identify alternatives that support health in the community.

To identify how the Framework can be used within agencies' transportation planning efforts, there are several questions to consider before implementation:

- **What is the agency's established process?** If the agency's corridor planning process is similar to steps described in the Framework, steps can be matched to the existing process. This allows consideration of health without a major overhaul in established processes.
- **Where is the agency at in the process?** The Framework can be used at any point in the process, but previous steps can also be checked to ensure something worthwhile was not missed.
- **What partnerships exist or need to be developed?** Having preexisting relationships with health professionals is the quickest way to start gathering information, resources, and perspectives. Transportation agencies often have staff that work with public health or other health support agencies, which can be a starting point.
- **What are the important health-related topics and efforts?** Consider topics/processes that may support incorporating health. Examples include active transportation, Complete Streets, sustainability, land use, and comprehensive planning. It is important to understand what other efforts may already be underway in relation to health outcomes.

Who Can Lead?

Planners, Designers, Operators, Researchers, Program Managers, Modal administrators, Public involvement specialists, Environmental specialists, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and low level of effort

When? Planning, Scoping, Project Development, Design, NEPA

What are the Potential Benefits?

- **Enhanced partnerships** – the Framework allows transportation professionals to work with agencies, groups, and individuals who specialize in health and can contribute to healthier communities.
- **Awareness of public health issues and opportunities** – provides an opportunity to address public health issues within transportation processes, including access to health services/healthy food, reduced emissions, active transportation options, or a combination of these.
- **New health-related goals and objectives in transportation processes** – considers the health impacts of potential transportation policies and projects and creates potential solutions for issues.¹¹

How Have Others Connected Their Communities?

Using the Framework in Akron, Ohio – Akron’s Metro Regional Transit Authority’s (METRO) South Arlington Corridor is a high-frequency 3.5-mile long transit corridor with strong ridership. Many residents in the corridor are minority, low-income, and elderly. Metro wanted to improve bus service efficiency and reliability along this corridor by reducing the number of bus stops. Consolidating bus stops would potentially result in shorter travel times, better schedule adherence, and improved customer satisfaction. Historically, METRO relied heavily on statistical analysis for consolidation that could overlook these minority, low-income, and elderly populations. METRO used the Framework to consider physical activity, equity, and access and engage with the affected community. While bus stop consolidation can have potentially positive health outcomes due to increased walking, it was important to consider the hardship this could cause for some populations in the area. The chosen alternative allowed METRO to develop a bus stop consolidation scenario that protects access to medical/health facilities and healthy food options while improving travel time and schedule adherence for transit customers.¹³



METRO’s South Arlington route (Source: FHWA¹²).

How Can I Get Started?

[Health in Transportation](#)
[FHWA Health in Transportation Framework](#)
[FHWA Health in Transportation Resources](#)

¹¹https://www.fhwa.dot.gov/planning/health_in_transportation/planning_framework/the_framework/step00.cfm

¹²https://www.fhwa.dot.gov/planning/health_in_transportation/planning_framework/framework_test_cases/akron/index.cfm

¹³https://www.fhwa.dot.gov/planning/health_in_transportation/planning_framework/framework_test_cases/akron/index.cfm

AP-7 Planning and Environmental Linkages provides early integration of transportation project goals with environmental and community values to streamline implementation.

What are Planning and Environmental Linkages?

Planning and Environment Linkages (PEL) provide a collaborative and integrated approach to transportation decision-making that considers environmental, community, and economic goals early in the transportation planning process. PEL uses the information, analysis, and products developed during planning to inform the environmental review process.



The objective of the PEL approach is to streamline project delivery by incorporating elements of alternatives analyses in any type of transportation planning study conducted at the corridor or subarea level, directly or by reference into NEPA. Considering and documenting NEPA objectives and requirements during the planning phase reduces duplication of effort and can lead to more informed project-level decisions at the planning stage.

The PEL process provides several key advantages. Its flexibility allows each PEL implementation to be shaped to fit the needs of a particular agency. Many PEL studies are supported by environmental screening tools that are available in various states and regions such as in Colorado, Florida, and Texas. The PEL approach helps improve community engagement and involvement by allowing the public an early opportunity to consider a range of options and direct the project in a way that is more acceptable to the community, while also fulfilling environmental documentation requirements.

What are the Potential Benefits?

- **Relationship-building** – encourages resource and regulatory agencies to get involved in the early stages of planning and gives these agencies an opportunity to help shape transportation projects and develop strong partnerships.
- **Improved project delivery timeframes** – minimizes potential duplication of planning and NEPA processes, creating one cohesive flow of information. In addition, improvements to inter-agency relationships may help to resolve differences on key issues as transportation programs and projects move from planning to design and implementation.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program managers, Modal administrators, Public involvement specialists, Environmental specialists, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$
and low level of effort

When? Planning, Scoping, Project Development, Design, Preliminary Engineering, NEPA

- **Aligned community and environmental outcomes** – equips transportation planners with information about NEPA-level resource considerations and helps coordinate with resource agencies and the public to address those considerations. As a result, planners are better able to design transportation programs and projects that serve the community's transportation needs more effectively.

How Have Others Connected Their Communities?

Implementing community supported actions more quickly – Denver Public Works identified the need for significant safety improvements along Federal Boulevard. However, a specific roadway solution and funding were lacking. By integrating the environmental review process early into planning, they were able to deliver this project more quickly than following the transportation project development process through its traditional sequence. The project team completed the PEL study in 2009 and the project is currently under construction. The entire environmental assessment and review took only 13 months.¹⁴

Improving project development – Planners assessed an intersection realignment using an MPO-based PEL approach in Hueytown, Alabama. The planning level assessment identified a needed gas station relocation. Through the PEL process, the MPO also determined that the original alignment impacted a popular local drug store. By defining this effect early in the process, the planners developed an alternative that eliminated the impacts on these facilities and received community support.¹⁵

Streamlining data management – The Utah DOT developed a state-level PEL approach termed uPEL. uPEL is a geospatial tool that integrates diverse resource data sets relevant to planning and environmental review and includes an automated process to assist in the screening and evaluation of transportation projects with respect to potential impacts on sensitive resources. The management of diverse data sets included a multi-agency Memorandum of Understanding to share data resources that streamlined the data compilation effort for each project. The uPEL approach allowed planners to quickly screen some 4,000 possible alternative freight rail alignments for the contemplated Uintah Basin Rail project. UDOT estimated a savings of \$2,500,000 and 22-28 months on this single environmental review associated with the uPEL resource.¹⁶

How Can I Get Started?

[Planning and Environmental Linkages](#)

[“How to Implement PEL”](#)

[Measuring the Benefits of PEL](#)

[PEL Questionnaire](#)

[EDC PEL site](#)

¹⁴ https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_benefits_report.aspx

¹⁵ https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_benefits_report.aspx

¹⁶ https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_benefits_report.aspx

AP-8 PlanWorks is a systematic web-based resource that supports collaborative decision-making to deliver projects that meet environmental, community, and mobility needs.



What is PlanWorks?

[PlanWorks](#) is a web resource that supports collaborative decision-making in transportation planning and project development. PlanWorks is built around key decision points in long-range planning, programming, corridor planning, and environmental review. PlanWorks suggests when and how to engage cross-disciplinary partners and stakeholder groups. This approach can help build consensus throughout these processes. PlanWorks includes:

- **A Decision Guide** - A troubleshooting guide describing the common decision points and opportunities for cooperation in the transportation planning and environmental review process. For each of the key decision points, PlanWorks provides policy and stakeholder questions, data needs, case studies and examples. Additionally, PlanWorks provides links to tools that can help support the decision.
- **Assessments** - Interactive assessment tools that enable project stakeholders to identify opportunities to work together, improve interagency cooperation, and expedite project delivery.

Who Can Lead? Elected officials, Local or tribal government staff, Planners, Designers, Engineers, Operators, Researchers, Program managers, Modal administrators, Public involvement specialists, Environmental specialists, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? As needed

- **Applications** – A series of special topics that provide specific information and approaches for how these topics can be considered in the collaborative decision-making framework. Applications include
 - Bicycles and Pedestrians.
 - Capital Improvements.
 - Economic Development.
 - Freight.
 - Greenhouse Gas Emissions.
 - Human Environmental.
 - Land Use.
 - Linking Planning and Operations.
 - Natural Environmental and Implementing Eco-Logical.
 - Performance Measures.
 - Planning and Environmental Linkages.
 - Public-Private Partnerships.
 - Safety and Security.
 - Stakeholder Collaboration.
 - Streamlining a Congestion Bottleneck Project.
 - Transportation Conformity.
 - Visioning and Transportation.

What are the Potential Benefits?

- **Potential solutions** – identifies and overcomes barriers when plans and projects of all scales hit roadblocks. Also helps to diagnose specific barriers and strategies to address those through improved collaboration.
- **Practical information at all steps of the planning process** – provides detailed information about decisions made in long range planning, corridor planning, programming, or environmental review.
- **Proactive perspectives** – integrates new and emerging topics into the decision-making process.

How Have Others Connected Their Communities?

Rescoping a project for successful funding. The Washington Department of Transportation used PlanWorks on the SR 509 Corridor Completion Project outside of Seattle, Washington – a project in which preliminary design and a record of decision had been issued, but funding was elusive. As non-traditional funding sources were explored, the WSDOT project team worked collaboratively with stakeholders and successfully re-defined the scope of Phase 1, which reduced the initial project implementation cost by about \$400 million while preserving most of the project benefits – all using the PlanWorks Decision Guide.

Developing a stronger and more collaborative Complete Streets Plan. The Minnesota Department of Transportation (MnDOT) helped the city of Grand Rapids, MN to collaborate with stakeholders and successfully design its Complete Streets Plan. In 2011, the City adopted a Comprehensive Plan update with the City's vision for a community where "residents and visitors can move around the City with equal ease by car, bicycle, walking or other mode of transportation. Together MnDOT and the City adapted PlanWorks to improve their stakeholder groups, spanning from traditional public ones to those such as transit agency, school district, the agricultural board, local charitable and civic organizations, and advocacy groups. Using the questions in the decision guide, MnDOT helped develop a consensus on a community and stakeholder vision for Complete Streets.

How Can I Get Started?

[PlanWorks](#)

AP-9 Multidisciplinary teams use Road Safety Audits to identify safety concerns for all road users.

What is a Road Safety Audit?

A Road Safety Audit (RSA) is a formal safety performance review of an existing or new road or intersection by a multidisciplinary team operating independently from project-level staff. The purpose is to examine potential road safety issues and find methods to improve the roadway for all users.

RSAs can help address safety issues. Depending on the context of the roadway, RSAs can also help incorporate nonmotorized users. Traditional safety reviews are valuable in their own right and can consider Community Connections for vulnerable users. For example, Safe Routes to School programs use education, encouragement, engineering, and enforcement to improve safety for students and make them more likely to walk and bike to school. They identify areas where safety is a barrier and work to improve those areas in a similar manner to RSAs.¹⁷ While many State DOTs conduct traditional safety reviews, it is important to note the differences between these and Road Safety Audits.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Operators, Program Managers, Modal administrators, Health professionals, Community advocates/groups

How Difficult? \$\$\$\$
and low level of effort

When? Planning, Scoping, Project Development, System Operations, Maintenance

Road Safety Audit	Traditional Safety Review
Performed by a team independent of the project to provide a fresh set of perspectives; often generates a formal report.	The safety review team is usually not independent of the design team; does not typically generate a formal report.
Performed by a multi-disciplinary team to incorporate professionals such as law enforcement, first responders, or school administrators who have unique perspectives on safety challenges.	Typically performed by a team with only design and/or safety expertise.
Considers all potential road users.	Often concentrates on motorized traffic.
Accounting for road user capabilities.	Does not normally consider human factor issues.

What are the Potential Benefits?

- **Improved multimodal safety** – can result in actions that reduce crashes and improve conditions for all roadway users, such as pedestrians, bicyclists, and transit riders.
- **Adaptability** – can be integrated into any size project, from minor intersections to large projects.

¹⁷ <http://www.saferoutesinfo.org/>

- **Cost savings** – lifecycle costs can be reduced because safer designs typically have lower maintenance costs; societal costs of collisions can be reduced due to safety improvements; liability claims from crashes can be reduced; for new roads, potential reconstruction costs from safety deficiencies can be reduced or eliminated.
- **Enhanced awareness** – promote awareness of safe design practices.

How Have Others Connected Their Communities?

Using a road diet to improve an intersection –

A team conducted an RSA at an intersection in Grand Rapids, Michigan. Prior to the RSA, the traffic signal heads were on a diagonal wire, with only one head over the travel lanes. There were two lanes with a dashed white pavement marking. Following the RSA, the traffic signals have been hung from a box span of wire directly over the travel lanes. Additionally, there are now three traffic signal heads and a separated left-turn lane, indicated by the solid pavement marking.



Before and after pictures from a Road Safety Audit at an intersection in Grand Rapids, Michigan (Source: FHWA¹⁸).

Applying the tool across different contexts -

NYS DOT has conducted many of their own RSAs. They have reduced crash rates from 20-40 percent at over 300 locations with a variety of low cost improvements.

Receiving economic and safety benefits --

The South Carolina DOT has an RSA program that has shown positive results in its first year. One location implemented all 9 suggested improvements from an RSA and saw a 60 percent reduction in fatalities. This resulted in an economic savings of \$3.66 million dollars. Another location implemented 25 of the 37 suggested improvements from their RSA. They had a 23.4 percent reduction in crashes, with an economic savings of \$147,000.

How Can I Get Started?

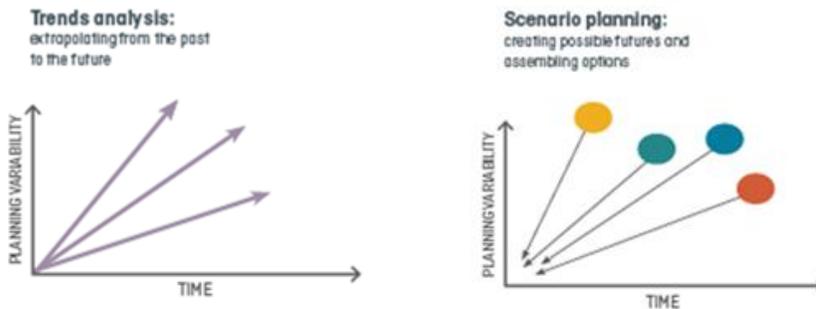
- [FHWA Road Safety Audits \(RSA\)](#)
- [FHWA Tribal Road Safety Audits: Case Studies](#)
- [FHWA Road Safety Audit Guidelines](#)
- [FHWA Proven Safety Countermeasures: Road Safety Audits](#)
- [FHWA Bicycle Road Safety Audit Guidelines and Prompt Lists](#)
- [NCHRP Synthesis 336: Road Safety Audits](#)
- [NHI Road Safety Audits/Assessments Course](#)

¹⁸ <https://safety.fhwa.dot.gov/rsa/>

AP-10 Scenario Planning explores multiple project approaches to help optimize connections.

What is Scenario Planning?

Scenario planning typically refers to a State or local planning process that develops or tests various future alternatives to determine whether these scenarios address stakeholders' needs. It differs from traditional trend analysis in that trend analysis simply extrapolates from the past into the future.



*Trend analysis versus scenario planning.*¹⁹

Who Can Lead?

Local or tribal government staff, Planners, Engineers, Program Managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$-

\$\$\$\$ and low-high level of effort depending on scope

When? Planning, Scoping, Project Development, Design, Preliminary Engineering, System Operations

Key elements in scenario planning include:

- Use of scenarios to compare and contrast interactions between multiple factors, such as transportation, land-use, and economic development.
- Analysis of how different land use, demographic, or other types of scenarios could impact transportation networks.
- Identification of possible strategies that lead a State, community, region, or study area toward achieving elements of the preferred future.
- Public engagement throughout the process.²⁰

Scenario planning remains an underutilized tool due in part to the challenges identified through a nationwide NCHRP survey. These challenges include: perceived magnitude of public involvement required, perceived required funding, lack of knowledge and skill to develop appropriate scenarios, “Low/no growth” challenges (how does scenario planning apply if limited growth is anticipated?), and data requirements that may result in increased time and cost for planning activities.

¹⁹https://www.fhwa.dot.gov/planning/scenario_and_visualization/scenario_planning/publications/next_gen/chapter01.cfm#toc492644122

²⁰ <https://ops.fhwa.dot.gov/publications/fhwahop16016/ch2.htm>

What are the Potential Benefits?

- **Improved process for emerging issues in planning** – helps communities explore new ideas and concerns such as performance-based planning, climate change adaptation, public health, autonomous vehicles adoption, equity, etc.
- **Risk and uncertainty management** – explores other types of “what-ifs” to determine which potential futures perform better under different circumstances.
- **More resilient decisions and outcomes** – can result in systems-level decisions that are more robust across a variety of futures and developed by a diverse set of stakeholders to identify critical factors.²¹

How Have Others Connected Their Communities?

Using scenario planning to confirm project impacts on small area vision. At the neighborhood or community scale, scenario planning can examine project impacts more specifically. In Buffalo, New York, the One Region Forward collaborative used its U.S. Housing and Urban Development Sustainable Communities Initiative²² funding to support scenario planning pilots. One pilot was using Scenario Planning to imagine how the planned removal of the Robert Moses Parkway north and the construction of the Niagara Falls Intermodal Railway Station could help in the revitalization of the surrounding neighborhood and model the impacts of specific projects using targeted indicators. Through this process, the Collaborative determined that the removal of the Parkway and development of the Station could enhance the vibrancy of downtown Niagara Falls and create opportunities for sweeping change throughout the entire city. This was based on the preferred scenario resulting in 600 new residents, over 550 new jobs, 500,000 square feet of brand new construction, rehabilitation of almost 400,00 square feet of abandoned buildings, \$11-17 million in new tax revenues, and reduction of impervious surfaces by 17 acres.²³

How Can I Get Started?

[FHWA Scenario Planning](#)

[APA Scenario Planning](#)

[NCHRP Snapshots of Scenario Planning](#)

[Lincoln Institute of Land Policy's Scenario Planning Portal](#)

²¹ <https://ops.fhwa.dot.gov/publications/fhwahop16016/ch2.htm>

²² From 2011-2015, HUD supported regional and local planning efforts that helped communities integrate housing, transportation, infrastructure and environmental goals to realize their visions for a more prosperous future. <https://www.hudexchange.info/programs/sci/>

²³ http://uploads.oneregionforward.org/content/uploads/2015/02/1RF_ScenarioPlanningPilotProject_NiagaraFalls_RMPFINAL_small.pdf

PUBLIC INVOLVEMENT STRATEGIES

PI-1: Design Charrettes	56
PI-2: Experiential Public Engagement	58
PI-3: Stakeholder Engagement.....	60
PI-4: Virtual Public Engagement.....	62
PI-5: Visualization Techniques	64

PI-1 Design Charrettes develop project designs or visions through intensive, multi-disciplinary workshops.

What is a Design Charrette?

A charrette is a meeting where participants work together collaboratively to reach a resolution for a specific problem or goal. Some components of charrettes include:

- Definition of issues to be resolved.
- Analysis of the problem and alternative approaches to solutions.
- Assignment of small groups to clarify issues.
- Use of staff people to find supporting data.
- Development of proposals to respond to issues.
- Development of alternative solutions.
- Presentation and analysis of final proposal(s).
- Consensus and final resolution of the approach to be taken.

Typically, design experts meet with community groups, developers, and neighbors over a period lasting from one day to a couple of weeks, gathering information on the issues that face the community. Charrette participants then work together to find design solutions that will address the issues that stakeholders have identified as priorities. This ultimately results in a clear, detailed, realistic vision for the project. Some best practices include:

- Designing tailored, participant-appropriate approaches to the charrette process.
- Inviting broad participation (e.g., all those directly impacted, all those indirectly impacted and all the decision-makers).
- Setting attainable charrette goals and identifying future milestones.
- Having a top decision-maker welcome and validate the importance of their participation.
- Using high-quality, trusted information to provide a basis for meaningful participation.
- Addressing participants' information needs promptly and as comprehensively as possible.

Design charrettes help decision-makers work with participants to achieve feasible decisions, by identifying constraints, teaching relevant design principles, and offering professionals insights on the outcomes of different design approaches.

What are the Potential Benefits?

- **Interdisciplinary problem-solving** - The breadth of participant backgrounds assures full discussion of issues, interrelationships, and impacts. Short duration events challenge people to rapidly, openly, and honestly examine problems, brainstorm options, and help resolve adversarial positions to reach consensus on an appropriate solution.
- **Greater public involvement** - It offers people interaction with public agencies and allows questions to be asked before decisions are made. It supplements, but does not replace, other kinds of public involvement.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$

- \$\$\$\$ and low level of effort

When? Planning, Project Development, Design



- **Focus on consensus and results** - Provides useful ideas and perspectives early in the planning process from concerned interest groups. In mid-process, a charrette helps resolve contentious issues. Late in the process, it is useful to build consensus among groups.

How Have Others Connected Their Communities?

Transforming a transit hub into a dynamic public space. Staff from Hennepin County in Minnesota brought together over 50 residents, architects, and designers to look at early plans for a transit hub. Through the design charrette process, participants identified a new track alignment to reduce the transit impacts on the surrounding neighborhoods while accommodating future development opportunities. It also led to space for a wider sidewalk and three new development parcels.

“Placekeeping” in an urban neighborhood. Residents expressed concern that planned improvements to the I-40 corridor in Nashville, Tennessee could hasten gentrification. Through the USDOT’s Every Place Counts Design Challenge, the Metropolitan Government of Nashville and Davidson County (Metro) hosted a design charrette to explore design solutions while safeguarding the community from demographic shifts and ensuring that residents could continue to afford living in the area if the proposed neighborhood improvements resulted in increases in property values. Recommended improvements from the charrette included new bicycle lanes and transit routes, increased parking, context-sensitive infill opportunities, conversions of interchanges to roundabouts, and reconnections of local roads.²⁵ Since this charrette, Metro has rescoped two intersection projects on Jefferson Street to support the chosen design more effectively. They have also discussed expanding the concepts to other bike facilities nearby.

“This community is not interested in placemaking--we’re interested in ‘placekeeping.’ Let’s open ourselves to the possibilities that arise from meeting the needs of the community, from supporting cohesiveness. We can ‘do transportation,’ but in a way that’s more.” - Participant



A participant drafting a visual of a roundabout to replace one of the intersections in the Nashville charrette. (Source: FHWA²⁴).

How Can I Get Started?

[FHWA Public Involvement Techniques Making Every Place Count](#)
[EPA’s Public Participation Guide: Charrettes](#)

²⁴ <https://www.fhwa.dot.gov/publications/publicroads/17janfeb/04.cfm>

²⁵ <https://www.fhwa.dot.gov/publications/publicroads/17janfeb/04.cfm>

PI-2 Experiential Public Engagement immerses stakeholders in new possibilities for a project's concept and design.

What is Experiential Public Engagement?

Experiential Public Engagement uses techniques that allow stakeholders to experience or explore changes or provide input in community context or within a project. Unlike more traditional public meetings, this tool uses engaging activities to inform perceptions, increase knowledge, and shape perspectives. Info collected through this type of process can be more informative and rewarding than just a survey or poll. Examples of experiential public engagement activities include:

- Walking Audits or Assessments – Walking audits allow various stakeholders to come together to experience walking/biking conditions, discuss what they experienced, and build consensus around possible solutions.
- Open Streets/Better Block events – temporarily reallocate street space to non-automobile uses to show how the space can be used differently when not prioritized for vehicles.
- Indoor Facility Demonstrations – Indoor demonstrations happen in a controlled environment from trying out new wayfinding or gamification of transportation options (i.e., making processes into playable games for a better understanding of their outcomes), to demonstrating new engineering treatments.
- Intercept Surveys – engaging users when they are using an actual facility and asking their perspectives on recommendations or challenges with the existing conditions.

When implementing experiential public engagement, it is important to consider the audience and what types of engagement activities they may best respond to. Additionally, factors such as safety, permitting for road closures, and weather conditions (for outdoor activities) must be considered.²⁶

What are the Potential Benefits?

- **Captures personal responses** – provides in-person, qualitative reactions from stakeholders that goes beyond raw data from a survey.
- **Provides temporary demonstration** – allows stakeholders and involved agencies to experience and implement changes that are not permanent.
- **Influences public opinions** – helps to increase knowledge, inform/change stakeholder perceptions, and show possibilities beyond what static presentations and reports can do.

Who Can Lead? Local or tribal government staff, Planners, Engineers, Program managers, Modal administrators, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? Planning, Scoping, Project Development, Construction/Reconstruction

²⁶ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/qualitative_data/fhwahep17075.pdf



How Have Others Connected Their Communities?

Assessing the pedestrian experience through walking audits In Bellevue, Washington, the City led multiple walking audits for members of the Downtown Bellevue community to share firsthand knowledge of their walking environment and to jointly develop improvement strategies as a key input to their 2030 Downtown Transportation Plan.²⁷



A walk audit in Florence, Arizona (Source: www.pedbikeimages.org / Sree Grajula).

Intercepting residents and visitors to understand uses – The San Francisco Municipal Transportation Agency used intercept surveys to gauge transportation and spending habits to advise transportation planning decisions as part of a safety and public realm improvement project on Polk Street. The agency talked with over 400 people to understand if they were residents, the mode they used to arrive at Polk Street, and their spending habits.²⁸

Opening streets for alternative uses – In Los Angeles, CA, the nonprofit CicLAvia hosts open streets events to encourage vibrant public spaces, promote active transportation, and boost positive health outcomes through carless streets. The events are free and help to create a safe place to use nonmotorized transportation modes throughout the city. Since starting in 2010, CicLAvia has created over 166 miles of open streets while reaching over 1 million people. CicLAvia has five times more people using its public space during event day than the amount of people using all of the other parks in the city combined. Their events have impacted local and regional transportation policy for bicyclists and pedestrians and improved air quality by reducing motor vehicle emissions.²⁹

How Can I Get Started?

[Incorporating Qualitative Data in the Planning Process: Improving Project Delivery and Outcomes](#)

[Transportation Planning Capacity Building on Public Engagement](#)

[FHWA Public Involvement](#)

²⁷ http://feetfirst.org/wp-content/uploads/2013/02/Bellevue_2012.pdf

²⁸ <https://www.sfmta.com/sites/default/files/projects/PolkInterceptSurveyFindings.pdf>

²⁹ http://www.ciclaviala.org/about_ciclaviala

PI-3 Stakeholder Engagement includes community members in the decision-making process.

What is Stakeholder Engagement?

Stakeholder engagement is a process that creates a discussion between communities that may be impacted by a project and the agencies or other partners in charge of project implementation and outreach. Stakeholder engagement can include many different types of people such as:

- Local residents and community groups.
- Community leaders.
- Local business owners and property owners.
- Elected officials and their staff.
- Staff from other government organizations.
- Chambers of commerce and other business groups.

Who Can Lead? Local or tribal government staff, Planners, Engineers, Program managers, Modal administrators, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? Planning, Scoping, Project Development, Construction/Reconstruction

During a planning project, stakeholder engagement may go through various phases, with diverse techniques for community input and action. During the first phase, the goal is listening, discovery, and big picture goals and challenges. These activities help identify the problems that can be solved and the potential goals of any given project. The next phase is to identify appropriate solutions through collaboration and iterative communications. Finally, recommendations lead to implementation through an ongoing dialogue and collective action.

While stakeholder engagement is a great and vital part of the planning process, it is important to note that communities can become fatigued by too many requests for participation. Additionally, if planners do not provide quick and reliable feedback, updates, and relevant results, citizens may become disenchanted with the process. This could lead to a lack of future participation and project delays.

Therefore, it is important to consider and incorporate stakeholder engagement techniques in a way that allows for maximum participation and input but does not overburden any particular group of participants. Additionally, appropriate incentives should be determined prior to beginning stakeholder engagement. A detailed and timely schedule for feedback, updates, and results should be implemented so that stakeholders are actively engaged in the process and can recognize the results of their time and commitment.

What are the Potential Benefits?

- **Citizen input** – provides local knowledge, concerns, and opportunities from the viewpoint of people who live in the area and have a stake in the project's implementation.
- **Cost effective** – provides an opportunity to gain feedback and suggestions prior to project implementation, which may save money toward costly redesigns.
- **Positive exposure** – casts the agencies involved in a positive light with involved stakeholders and helps build community trust and support.

How Have Others Connected Their Communities?

Stakeholder engagement includes many diverse techniques for effective dialogue between communities and agencies. These include but are not limited to the following: pop-up meetings, public meetings, stakeholder meeting/focus groups and collaborating with community ombudsmen.

Pop-Up Meetings – Pop-up meetings are an increasingly popular technique to expand the reach of public engagement for plans and projects. These meetings allow key partners (e.g., community organizations, church boards, neighborhood associations, advocacy groups, and other civic organizations) to take a more active role in outreach. Locations can include school events, sporting events, farmer’s markets, neighborhood meetings, and others.



Focus group meeting in Central New Mexico (Source: U.S. DOT, Volpe Center³⁰).

Public Meetings – Public meetings are a traditional and commonly used form of stakeholder engagement that allows agencies to gather input and exchange information with a variety of residents. They typically involve a presentation, a public discussion or Q&A, and a summary of outcomes. The purpose of a public meeting can vary at different stages of the planning process. Different formats may include: visioning (establishing a vision or goal for a plan/project); informational (providing a clear explanation of a process, when the public will be involved, and deadlines); and selection (choosing between different options or recommendations).

Stakeholder Meetings and Focus Groups – Stakeholder meetings and focus groups are small group discussions that allow stakeholders to have a more specialized discussion about issues and goals. A facilitator leads them, keeps the discussion on topic, and keeps track of responses.

Community Ombudsmen – A public-sector ombudsman is a public official who receives citizen inquiries about government administrative actions and conducts an independent investigation of them. For example, the Washington State DOT SR 520 Bridge Replacement and HOV Program utilized an ombudsman to address impacts, challenges, and trade-offs for members of the community. While this project promised many benefits, the state wanted community members to have a point of contact for any issues and to be confident in a fair hearing by decision-makers.³¹

How Can I Get Started?

[Incorporating Qualitative Data in the Planning Process: Improving Project Delivery and Outcomes](#)

³⁰ https://www.volpe.dot.gov/sites/volpe.dot.gov/files/IMG_0296-small.jpg

³¹ [Washington State DOT’s Ombudsman/Community Liaison for the SR 520 Bridge Replacement and HOV Program.](#)

PI-4 Virtual Public Engagement allows stakeholders to contribute to community conversations on their own schedule, in their homes, or on their devices.

What is Virtual Public Engagement?

Virtual Public Engagement uses tools and techniques in combination with new technology to let stakeholders participate in planning processes in their own way and on their own time. These tools allow State DOTs, MPOs, local and tribal governments, and other practitioners to inform the public and receive feedback. In addition to making participation flexible for everyone, Virtual Public Engagement can also better serve those with disabilities or language barriers who may have had limited participation with traditional outreach methods.

Virtual Public Engagement includes a wide array of tools, such as:

- Wikimaps or other online interactive crowdsourcing maps that gather feedback on proposed actions.
- Online surveys or simulated decision-making exercises that are administered to understand public opinion or explore tradeoffs.
- Videos that help illustrate topics and gather responses.
- Street simulators or online interactive tool that allows users to design/experience a street cross-section.
- Data hacks or hack-a-thons which are events that encourage people to use technological skills to build solutions to current problems.
- Social media and websites with user-friendly features such as online videos, podcasts, and other interactive forums.
- Telephone town halls that allow agencies to conduct large-scale outreach.

Virtual Public Engagement techniques are a complement to the in-person engagement process. Although technology has increased our capability to communicate and interact with each other, accessibility to new technologies with computers and/or cell phones can still present a barrier to some people, due to economic issues, unfamiliarity of use or lack of technology access among other considerations.^{32,33}

What are the Potential Benefits?

- **Flexible scheduling** – provides online utilization of tools and techniques that can be accessed according to respondents' availability.

Who Can Lead?

Local or tribal government staff, Planners, Engineers, Program Managers, Modal administrators, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? Planning, Project Development, Design

³²

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/qualitative_data/fhwahep17075.pdf

³³

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/virtual_public_involvement.cfm

- **Broader participation** – involves more stakeholders, including those who can participate because of scheduling convenience or who were previously limited due to disabilities or other considerations.
- **Engagement** – keeps stakeholders involved throughout the longer planning process and maximizes response rates.
- **Efficiency and lost cost** – provides a means to engage the public at a lower cost than traditional public outreach efforts.
- **Accelerated project delivery** – helps to identify issues early in the planning process and reduces the need to revisit decisions.

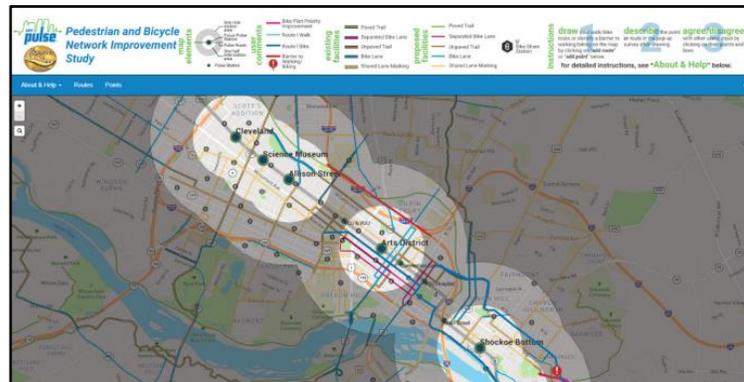
How Have Others Connected Their Communities?

Illustrating bicycle stress – In Charlotte, NC, the Charlotte Regional Transportation Planning Organization (CRTPO) used video feedback surveys to ask the public how they felt regarding planners’ determination of bicycle stress on local roadways. These videos were filmed from a bicyclist’s point of view and show various conditions. After watching the videos, the public could comment on whether they thought the stress level of a roadway was acceptable or not and why they felt that way. Their feedback provided valuable information on local perceptions of bicycling conditions.



Level of Stress video capture for Charlotte, NC (Source: FHWA).

Targeting specific uses – In September 2016, FHWA, the Federal Transit Administration, and the City of Richmond began developing recommendations for improving bicycle and pedestrian access to seven Bus Rapid Transit (BRT) stations in Richmond, VA. Previous public outreach had shown that residents along the BRT corridor, known as The Pulse, wanted to be able to bicycle safely to the BRT line and access Broad Street and Main Street. The study team used a wikimap to gather information on citizens’ experience biking and walking in the area. Some of the data collected included the following: preferred routes, areas of concern, barriers to accessibility, and potential improvements near the stations.



A screenshot of the Richmond project wikimap (Source: FHWA³⁴).

How Can I Get Started?

[Virtual Public Involvement](#)

[Incorporating Qualitative Data in the Planning Process: Improving Project Delivery and Outcomes](#)

³⁴ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/richmond_nis/fhwahep17074.pdf

PI-5 Visualization uses imagery to make information clear and understandable to the public and decision-makers.

What is Visualization?

Visualization in transportation uses visual imagery to display and explain information so the public and decision-makers can better understand it. Visualization techniques can be used for various purposes, including proposed policies, plans, designs, research, training, and many other areas. Examples include but are not limited to: artist renderings, conceptual diagrams, physical models/maps, interactive geographic information systems (GIS), GIS-based scenario tools, informational videos, and computer simulations.

While Visualization techniques can be an effective way to present and enhance transportation projects and processes, application of these techniques are often misunderstood. Some important Visualization myths and realities are listed below:

1. **Myth:** Visualization tools are expensive and not suitable for small scale projects.
Reality: There are many free tools available, such as SketchUp for 3D Street Scenes.
2. **Myth:** Visualizations are only used to “sell” a project.
Reality: More government agencies are using Visualization techniques as a decision-making tool to assess possible scenarios and choose between them.
3. **Myth:** You need a certain type of computer to create 3D Visualizations.
Reality: Special hardware is normally only necessary for the highest-end visual modeling.
4. **Myth:** Visualization is for one project or object at a time.
Reality: Three dimensional (3D) models can be created and used for large geographic areas, with both existing and proposed infrastructure.³⁵

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program managers, Modal administrators, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and moderate level of effort

When? Planning, Project Development, Design, Maintenance

What are the Potential Benefits?

- **Understandable** – makes complicated transportation processes, projects, or tools visually appealing and intuitive for viewers.
- **Multiple types and uses** – applies to transportation research, design, construction, and maintenance.
- **Innovative** – utilizes new technology to display and clarify information in unique ways.
- **Flexible and scalable** –provides dynamic and powerful tools for large projects, and free and easy-to-use tools for small projects.³⁶

³⁵ http://www.choosingviz.org/myth_busters/

³⁶ <https://www.fhwa.dot.gov/visualization/>

How Have Others Connected Their Communities?

Integrating Visualization into a comprehensive plan – Long-range plans can be advanced using images, maps, flow charts, illustrations, and other graphics. Rather than limiting their comprehensive plan to detailed policies, the Chicago Metropolitan Agency for Planning used Visualization techniques to enhance their ON TO 2050 plan. This plan includes several sections, such as community, prosperity, environment, governance, and mobility.³⁷

Providing information beyond routing – In Portland, OR, Metro’s Bike There! Map is available in print, but their website also features an interactive topographical map. This map shows established bikeways, bike friendly streets, designated bike lanes, helpful connections, areas to bike with caution, unpaved trails, and local paths.³⁸



*Gasoline Alley before-and-after simulation at Rio Road, Albemarle County, VA
(Source: FHWA³⁹).*

How Can I Get Started?

[FHWA Visualization](#)

[FHWA Scenario Planning and Visualization in Transportation](#)

[FTA Choosing Visualization for Transportation](#)

[Transportation Research Board – Visualization in Transportation Committee](#)

³⁷ <http://www.cmap.illinois.gov/onto2050>

³⁸ <https://www.oregonmetro.gov/tools-living/getting-around>

³⁹ https://www.fhwa.dot.gov/livability/case_studies/guidebook/livabilitygb10.pdf

PROJECT DEVELOPMENT AND DESIGN TECHNIQUES

PD-1: Community Benefits Agreements	67
PD-2: Complete Streets.....	69
PD-3: Context Sensitive Solutions	71
PD-4: Performance-Based Practical Design	73
PD-5: Road Diets	75

PD-1 Community Benefits Agreements engage local stakeholders in defining expectations and commitments as part of project development.

What is a Community Benefits Agreement?

A Community Benefit Agreement (CBA) represents a commitment between project implementers and community representatives. A CBA is typically formalized by a contract signed by a state or local government representing the interests of community groups and a real estate developer. A formal CBA generally requires the developer to provide specific amenities and/or mitigations to the local community or neighborhood. In exchange, the community groups agree to publicly support the project or at least not oppose it. CBAs may benefit the community by defining project elements of interest to the community, stipulating a level of community involvement (usually locally-based jobs or locally-sourced resources either during construction or after completion), or both.

The concept embodied in a community benefit agreement also has a much broader application within approval processes for both public and private development projects. The idea of incorporating specific programs, policies, or projects that help connect communities under the umbrella of a larger initiative can take several alternative forms, including mitigation elements within a NEPA Record of Decision or conditions of local zoning approval for private development site plans.

Two common concerns exist regarding formal community benefits agreements. First, coalitions of community groups should be those that are already representative of community interests as opposed to new groups formed solely to pursue a CBA. Second, where private sector development is concerned, the governing agencies involved in the land approval process should not be a party to a CBA due to potential conflicts with their development approval authorities.⁴⁰

The consideration of a community benefit agreement approach to project implementation can spur creative dialogue aimed at building consensus among project sponsors and community groups. In this regard, the delivery of desirable projects and programs can be accelerated through innovative project sponsorship.

Who Can Lead?

Elected officials, Local or tribal government staff, Planners, Engineers, Public involvement specialists, Community advocates/groups

How Difficult? \$\$\$\$ and low level of effort

When? Planning, Project Development

⁴⁰ <https://www.bostonfed.org/publications/communities-and-banking/2017/spring/do-community-benefits-agreements-benefit-communities.aspx>

What are the Potential Benefits?

- **Builds trust and support** – benefits the community in exchange for turning potential community opposition into potential project champions that may help foster accelerated project delivery.
- **Jobs and training** – helps with the hiring of local community members, particularly in historically disenfranchised communities.

How Have Others Connected Their Communities?

Funding multimodal needs – The application of Community Benefits Agreements can incorporate a wide range of commitments associated with public and private projects. For example, the City of Portland, Oregon applies a Transportation System Development Charge to private development projects in certain areas of the city. The Sullivan’s Crossing pedestrian bridge over I-5 is being financed primarily from system development charges.⁴¹

Ensuring benefits are shared prospectively – The Maryland Transportation Authority and the City of Baltimore are coordinating with the private developer of Port Covington on the *Access I-95* program which includes a CBA to ensure that jobs and benefits are shared with local communities and all transportation modes have safe and efficient access to the development site.⁴²

How Can I Get Started?

[Wikipedia Entry on Community Benefits Agreement](#)

[National Cooperative Highway Research Program Report 710: Practical Approaches for Involving Traditionally Underserved Populations in Transportation Decision-making](#)

⁴¹ <https://www.portlandoregon.gov/transportation/71338>

⁴² http://mdta.maryland.gov/sites/default/files/Files/FASTLANE/Access_I95_Project_Narrative.pdf

PD-2 Complete Streets enable safety and mobility for all users.

What are Complete Streets?

Complete Streets are designed and operated to enable safe use and support mobility for all users, including people of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, freight carriers, or public transportation riders. Complete Streets policies often use roadway design guidelines and can vary based on community context. They can include but are not limited to considerations such as sidewalks, bike lanes, bus lanes, transit stops/shelters, crosswalks, vehicle lanes, roundabouts, and landscape treatments.

To implement Complete Streets policies successfully, transportation agencies should consider the following steps:

- **Implementation planning** – assessing current procedures and planning for Complete Streets.
- **Changing decision-making** – updating plans/processes in transportation decision-making, from scoping to funding.
- **Reviewing and updating design guidance** – updating/adopting design guidelines for multimodal mobility.
- **Offering educational opportunities** – providing ongoing training/educational support for professionals and the public.
- **Measuring performance** – modifying or creating measures to reflect all roadway users at the project and network level.

What are the Potential Benefits?

- **Economic and stability** – provides accessible and efficient connections between schools, homes, parks, public transit, offices, and retail that can increase economic growth and stability.
- **Improved Safety** – reduces automobile crashes and bicycle/pedestrian injuries and fatalities through design improvements.
- **Better walking and biking options** – makes these modes more appealing through improvements to walking and biking facilities.
- **Reduced congestion** – increases mode choice options through safer, more efficient facilities that can increase the capacity of the roadway and reduce congestion.
- **Improved air quality** – reduces vehicle trips, which can reduce motor vehicle emissions in a community and potentially improve air quality.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$-\$\$\$\$ and moderate to high level of effort

When? Planning, Project Development, Design

How Have Others Connected Their Communities?

Using state policies to support local improvements – The North Carolina DOT used Complete Streets approaches to help revitalize a downtown in West Jefferson. A decline in local industry catalyzed the community to revitalize their downtown. The area featured old and ineffective street components (e.g., bad lighting, faded crosswalks, unattractive overhead utility lines) that discouraged commercial investment, while high speeds stifled pedestrian activity. Due to these concerns, a routine resurfacing of Jefferson Avenue ultimately became a Complete Streets effort. Streetscape enhancements included pedestrian-scale street lighting, street furniture, underground utilities, paved crosswalks with curb extensions, landscaping, and two modified intersections that converted signalization to stop-control. Because of these Complete Street design elements, Jefferson Avenue has seen both traffic calming effects and economic benefits. The number of vacant storefronts and apartments in the downtown has gone from thirty-three to five. The public has reported both reduced traffic speeds and increased feelings of safety when crossing the roadway. The changes from the improvements resulted in a \$13,800 yearly savings in maintenance costs. West Jefferson has since become a model for other communities to follow.⁴³

Improving multimodal access – In New Brunswick, NJ, the NJ DOT included a multi-use path, safer pedestrian crossings, and several new or enhanced pedestrian bridges along Route 18. New sidewalks and lighting were also integrated to improve the overall bicycle and pedestrian experience. The entire project improved multimodal access to nearby transit facilities. It was also one of the first applications of the State’s Complete Streets criteria.

Replacing a parkway with a new boulevard – In Niagara Falls, NY, the New York Power Authority is removing a parkway and transforming the nearby parallel roadway from a one-way street to a Complete Street. The project will rebuild some of the local roadway network and reconnect the nearby neighborhoods with the waterfront.

How Can I Get Started?

[USDOT: Complete Streets](#)

[Smart Growth America’s National Complete Streets Coalition](#)

[Complete Streets: Best Policy and Implementation Practices](#)

[Complete Streets in the Southeast: A Tool Kit](#)

⁴³ <http://www.completestreetsnc.org/project-examples/ex-westjefferson/>

PD-3 Context Sensitive Solutions incorporate community input in the development of a transportation project.

What are Context Sensitive Solutions?

Context Sensitive Solutions (CSS) are collaborative, interdisciplinary approaches that involve all stakeholders in the development of transportation projects. CSS is guided by four principles:

- A shared stakeholder vision used for decisions.
- A comprehensive understanding of contexts.
- Continuing communication and collaboration for consensus.
- Flexibility and creativity in transportation solutions, while also considering community and environmental desires and needs.

CSS entails consideration of a project's physical, economic, and social environment. Strategies that agency and department managers can use to implement CSS include:

- Encouraging interdisciplinary teams.
- Mentoring staff.
- Providing training.
- Using new technologies.
- Adopting performance measures.
- Documenting benefits from CSS projects.
- Incorporating lessons into policies and procedures.
- Reviewing design standards.

What are the Potential Benefits?

- **Reduced costs** – provides direct cost savings related to the right sizing of facilities, actions related to reducing environmental clearance, and avoidance of potential environmental and community impacts that can lead to expensive litigation and delay.
- **Tailored solutions** – helps designers know when to avoid or minimize impacts while still operating safely and efficiently.
- **On-time delivery** – helps agencies shorten the project development process and reduce the occurrence of redesign and litigation.
- **Sustainability** – preserves environmental, scenic, and natural resources within the area.
- **Environmental justice** – helps agencies adhere to environmental justice principles that ensure transportation projects do not have disproportionately high and adverse impacts on low-income or minority populations.

How Have Others Connected Their Communities?

Developing a cultural center – The Indianapolis Cultural Trail is an eight-mile trail that was designed as a part of a broader effort to stimulate Indianapolis' economy and its role as a

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program Managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and low to moderate level of effort

When? As needed



cultural center. A management team representing the City of Indianapolis placed a heavy emphasis on public engagement during the project development process. This included monthly brown bag lunches, an up-to-date website, and larger public meetings that helped to encourage and sustain support for the project.

The project was constructed in seven phases over a six-year span. Each corridor is independent because each district has unique historic and environmental considerations. Using CSS, the City of Indianapolis created shared spaces for bicyclists and pedestrians, narrowed travel lanes, eliminated right-turn-on-red traffic signals, created larger street corners with new accessible ramps, and included transit shelters for the local transit service IndyGo. The project also includes stormwater landscaping that made the trail more attractive and public art that highlights historic uses along the trail. The trail was fully completed in 2013 and included a public-private partnership with the Indiana Pacers professional basketball team to operate a bikeshare system.



The Indianapolis Cultural Trail utilized planters to provide buffers, capture stormwater, and add color to their trail (Source: www.pedbikeimages.org / Rundell Ernstberger Associates, LLC).

Addressing congestion and safety issues through an advisory committee – The Keaau-Pahoa Road (State Route 130) Improvements Project aims to address congestion and safety issues along a ten-mile stretch of a two-lane road in the Puna District within Hawaii. Turning movements out of the area’s numerous subdivisions are difficult during peak hours. The Hawaii DOT’s CSS process included the formation of a 25-member Keaau-Pahoa Advisory Group (KPAG). This group’s purpose was to develop a purpose and need statement, evaluation criteria, and alternatives. Members were selected based on an application process and included farmers, truckers, educators, bicyclists, representatives from the subdivision associations, and the county. County representatives included the mayor’s office, county council, the planning department, and the mass transit agency. Stakeholders and road users wanted to address impending growth in a way that considered and respected the current rural character of the area, which is near an active volcano and a national park. The KPAG’s areas of interest, with participation from the county, included the following: safe bicycle lanes, pull outs and waiting areas for bus riders, improved roadway drainage, trees and landscaping features, and increased roadway capacity with minimal land acquisition.

How Can I Get Started?

[FHWA Context Sensitive Solutions](#)

[CSS Case Studies](#)

[CSS Webinars](#)

[CSS Key References](#)

PD-4 Performance-Based Practical Design focuses on improvements that benefit project and system needs.

What is Performance-Based Practical Design?

Performance-Based Practical Design (PBPD) is a performance management framework that examines project scopes through a “design up” approach. PBPD uses performance analysis tools to consider both short- and long-term project and system goals while also considering purpose and need.

Practical Design vs Performance-Based Practical Design: There are some important differences between Practical Design and PBPD. Practical Design focuses strictly on purpose and need, while PBPD looks at decisions through a performance-management framework. With Practical Design, agencies may stress short-term cost savings without realizing how that will impact other goals, such as safety/operational performance, livability, Context Sensitive Solutions, and sustainability. In contrast, PBPD compliments these goals though performance information that aids the decision-making process. There are several keys to successful state implementation of PBPD, including the following:

- **Embrace PBPD:** Agency executives embrace PBPD and communicate this support to all State employees and consultants.
- **PBPD Champion:** PBPD champion leads implementation throughout all levels of the agency.
- **Revise Policies and Guidance:** Agencies revise policies and guidance as appropriate to include the values of PBPD, thus securing a multi-disciplinary and comprehensive approach to delivering projects under PBPD.
- **Empower Employees:** Agencies encourage and empower engineers to exercise judgments on projects based on PBPD principles.
- **FHWA Coordination:** FHWA Division Offices support agencies in their implementation with early and close coordination.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$
and low level of effort

When? Planning, Scoping, Project Development, Design

What are the Potential Benefits?

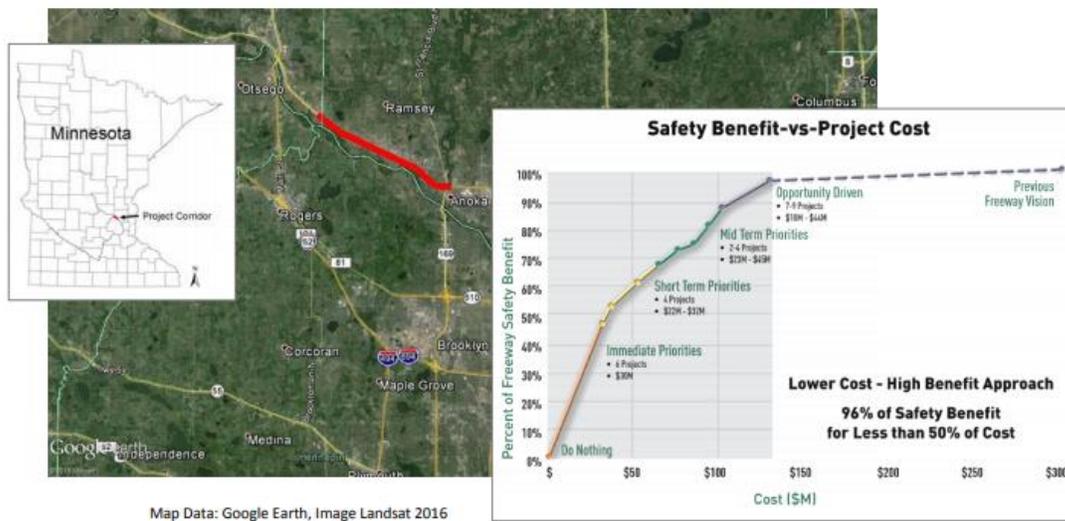
- **New performance goals** – creates projects that include features that serve short- and long-term goals.
- **Greater return on infrastructure investments** – examines each element of a project scope based on value, need, and urgency.
- **Flexible implementation** – PBPD does not eliminate or modify existing design standards or regulatory requirements, and it can be implemented into the Federal-aid Highway Program’s existing regulatory processes for a broad range of project types.



How Have Others Connected Their Communities?

Utilizing PBPD to develop less expensive alternatives – The Minnesota Department of Transportation (MnDOT) considered converting Highway 10 between Minneapolis/St. Paul and suburban areas from a four-lane divided highway into a freeway. However, using Performance-Based Practical Design (PBPD), MnDOT decided to develop less expensive safety and capacity improvement alternatives along a seven-mile section of Highway 10 that minimized adjacent land use impacts while staying within a limited budget.

After reviewing the potential improvement, MnDOT selected 20 projects to be quantitatively evaluated for implementation. Proposed projects were analyzed using the Highway Safety Manual (HSM) to quantify safety impacts using crash modification factors (CMFs). These CMFs were applied to crash data to determine potential crash reduction stemming from the proposed alternatives. The results indicated that the implementation of the 20 projects could provide many of the safety and mobility benefits of a freeway conversion at a significantly lower cost. With the PDPB approach, MnDOT determined that the projects would provide 96% of the safety benefit and 90% of the operational benefits at 50% of the cost.



Maps of the Highway 10 project in Minnesota show the location and the projected cost savings (Source: FHWA).

How Can I Get Started?

[Performance-Based Practical Design](#)

[FHWA Workshop on Performance-Based Practical Design](#)

[Performance-Based Practical Design: Technical Assistance](#)

[Performance-Based Practical Design: Case Studies](#)

[Performance-Based Practical Design: FAQ](#)

PD-5 Road Diets use the existing roadway more efficiently for more community uses.

What is a Road Diet?

A Road Diet reduces the number of travel lanes and/or effective width of the road. The reclaimed space is allocated for other uses such as turn lanes, bike lanes, sidewalks, street trees, landscaping, pedestrian refuges, bus lanes, bus shelters, or parking.

Road Diets have the potential to solve a number of traffic operations and safety issues and to incorporate non-motorized users when applied at appropriate locations. Common feasibility factors for Road Diets include the following:

- The need for improved safety for all road users.
- A desire to incorporate Context Sensitive Solutions and Complete Streets features.
- Operational considerations such as:
 - Whether the existing roadway operates as a de facto three-lane roadway.
 - The need for reduced speed or traffic calming.
 - Average daily traffic.
 - Multimodal level of service.
 - Peak hour volumes and peak direction.
 - Turning volumes and patterns.
- The presence of slow-moving or frequently stopping vehicles, such as transit and curbside mail delivery.
- A desire to better accommodate bicycles, pedestrians, and transit service.
- Right-of-way availability and cost.
- The existence of parallel roadways, parallel parking, and at-grade railroad crossings.
- Public outreach, public relations, and political considerations.

A Road Diet can be a low-cost safety solution when the installation is coordinated with other projects involving resurfacing, pavement markings, and roadway reconstruction.

What are the Potential Benefits?

- **Safety** – reduces crashes and enhances safety for all users.
- **Low-cost and streamlined delivery** – reduces costs and delivery times by being utilized during restriping projects or integrated into more comprehensive road redesigns.
- **Greater livability** – accommodates more transportation modes in the same right-of-way.

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$
and low level of effort

When? Planning, Project Development, Design

How Have Others Connected Their Communities?

Restoring an urban neighborhood main street – The City of Orlando, FL implemented a safety-based Road Diet that converted four lanes to three; and the road now has one travel lane in each direction and a center, two-way turn lane. The project emerged from a neighborhood improvement plan coupled with a planned resurfacing of Edgewater Drive in 2001. This change resulted in:

- 34 percent reduction in total crashes.
- 71 percent decline in injury rates.
- 30 percent increase in bike volumes.
- 23 percent increase in pedestrian volumes.

From 2008-2015, the corridor also gained 77 new business and 560 additional jobs. Since the project was first proposed, the value of property adjacent to Edgewater Drive has risen 80 percent, and the value of property within half a mile of the road has risen 70 percent.

Transforming an unsafe roadway into a main street – In Charlotte, NC, the City of Charlotte decided to implement a road diet on East Boulevard. This undivided, four-lane roadway had speeding and collision issues. The project was completed from 2005 to 2011 in three phases. Changes included converting the roadway to three vehicle lanes, adding new bicycle lanes, widening sidewalks, and installing decorative pedestrian-scaled lighting. While the roadway carries a similar number of vehicles, all traffic (pedestrian, bicycle, and motor vehicles) functions more efficiently due to turn lanes, bicycle lanes, and pedestrian refuge islands. Annual average daily traffic (AADT) dropped from 25,000 to 16,000 between 2004 and 2011. Overall roadway speeds and crashes have decreased, while non-residential property values have increased by 47% in one of the sections. Annual tax revenues in that section have also increased by \$530,000. Despite valid concerns and criticism during construction, feedback from the public has been generally positive since the road diet's completion. The biggest project lesson learned is that citizen education is a key component for success during similar projects.



Before and after pictures from a Road Diet on Edgewater Drive in Orlando, Florida (Source: FHWA⁴⁴).

How Can I Get Started?

[FHWA EDC “Road Diets \(Roadway Reconfiguration\)”](#)

[FHWA Road Diet Information Guide](#)

[NACTO Transit Street Design Guide](#)

⁴⁴ <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-3/roaddiets.cfm>

OPERATIONAL IMPROVEMENTS AND PROGRAMS

OI-1: Expanded Access to Transit	78
OI-2: Freight First-Mile and Last-Mile Connections	80
OI-3: Improved Transit Service	82
OI-4: Pilot Projects.....	84
OI-5: Shared Mobility Services	86
OI-6: Transit User Accommodations	88

OI-1 Expanded Access to Transit improves access to transit vehicles and stops for existing and potential riders.

What is Expanded Access to Transit?

Expanded Access to Transit includes infrastructure improvements that increase the ability of people to reach transit services and facilities. This includes new infrastructure such as new parking options, sidewalks, bicycle facilities, shared mobility services, and other active transportation amenities. The following should be considered when implementing access accommodations:

- For **pedestrian transit users**, transit accommodations should be considered within the half-mile pedestrian catchment area (defined by the radial distance from a transit facility, including crossing and intersecting streets) of an existing fixed route transit facility including stops/stations and park-and-ride lots.
- For **bicycle transit users**, transit accommodations should be considered within the 3-mile bicycle catchment area of an existing fixed route transit facility.
- For **all users**, transit accommodations should be considered between transit stops/stations and all other location destinations.

Who Can Lead?

Elected officials, Local or tribal government staff, Planners, Engineers, Program Managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and low to moderate level of effort

When? As needed

What are the Potential Benefits?

- **Mobility and access** – improves all users’ (those with vehicles, bicyclists, and pedestrians) transit access by considering accessibility and mobility to transit facilities.
- **Safety** – applies treatments that can improve user safety and security.
- **Multiple modes** – encourages more people to use pedestrian, bicycle, and transit facilities because of safer access.
- **Bicycle/pedestrian networks** – fills gaps and connects existing bicycle and pedestrian networks through these accommodations.⁴⁵

How Have Others Connected Their Communities?

Georgia DOT adopts Complete Streets Policy – In 2012, the Georgia DOT adopted a comprehensive Complete Streets policy that calls for the Department to incorporate bicycle, pedestrian, transit users, and motor vehicles into transportation projects. The need for transit users to be able to safely and conveniently cross roadways to access transit stops and stations has been heavily emphasized. Additionally, the development of safe streets for pedestrians and bicyclists going to those facilities is a major component. For example, Bull and Perry Streets in Savannah, GA feature safe bicycle and pedestrian facilities.⁴⁶

The following design guidelines are recommended by the Georgia Department of Transportation (GDOT), in reference to the Public Right-of-Way United States Access Board:

⁴⁵ <https://nacto.org/wp-content/uploads/2014/01/GDOT-Design-Policy-Manual-Chap09.pdf>

⁴⁶ <https://smartgrowthamerica.org/georgia-dot-adopts-complete-streets-policy/>

- **Location of sidewalk** – typically along urban shoulders.
- **Width of sidewalk** – minimum of 5 feet of unobstructed clearance for two wheelchairs to pass.
- **Pedestrian buffer area** – separates the sidewalk and the vehicle travelled ways; recommended 6-foot wide strip.
- **Bicycle lanes on urban roadways** – a 4-foot bicycle lane between the travelled way and gutter, with additional 2 feet width for bicycle lanes adjacent to on-street parking.
- **Shared lanes** – minimum width for a wide outside lane is 14 feet.



Complete Streets design features in Bellevue, WA (Source: www.pedbikeimages.org / Dan Burden).

The location, selection, and design of accommodations at a transit facility and for transit vehicles should be discussed with the appropriate transit provider and local government.⁴⁷

San Francisco BART installs bike lockers – Bay Area Rapid Transit (BART) in San Francisco, CA began implementing shared-use electronic lockers at their stations in 2008. Since then, BART has installed more than 500 electronic lockers that provide secure, weather-protected parking for bicyclists for those that need to park their bikes while utilizing transit services. In contrast to older generations of keyed lockers, BART’s electronic lockers allow for multiple users. This is beneficial given the space constraints at stations. Funding for the lockers was provided by the following grant sources:

- Alameda County Transportation Commission – Transportation Fund for Clean Air.
- FTA Congestion Mitigation and Air Quality.
- City of Fremont Transportation Development Act, Article 3.
- MTC’s Safe Route to Transit Program.
- Contra Costa County, Measure J Sales Tax.
- Caltrans State Transportation Improvement Program.

BART also offer hundreds of free bike racks and bicyclists can bring their bikes on most trains.⁴⁸

How Can I Get Started?

[GDOT Context Sensitive Design Online Manual](#)

[FHWA Bicycle and Pedestrian Program](#)

[TCRP Report 19: Guidelines for the Location and Design of Bus Stops](#)

[FTA's Manual on Pedestrian and Bicycle Connections to Transit](#)

⁴⁷ <https://nacto.org/wp-content/uploads/2014/01/GDOT-Design-Policy-Manual-Chap09.pdf>

⁴⁸ <https://www.bart.gov/news/articles/2012/news20120130>

OI-2 Freight First-Mile and Last-Mile Connections balance the provision of needed local goods with quality of life.

What are Freight First-Mile and Last-Mile Connections?

Freight first-mile and last-mile connections are stages in the goods movement process that involve stops for loading or unloading, often in locations with challenging access and circulation systems. Freight delivery, including items such as groceries, medicine, and even trash, is an essential part of local economies, yet the size and frequency of many delivery vehicles complicates transportation system operations and is often viewed as a nuisance. Effective planning, design, and operations that facilitate freight first-mile and last-mile connections can minimize the adverse effects of truck traffic while facilitating delivery.

The goods movement industry is evolving with e-commerce increasing distributed deliveries to individual addresses (notably residential destinations). Further, there is greater recognition of the “production-consumption link” in which truck traffic consists of separate linkages between production, warehousing, and delivery to the end consumer. The linkages relating to production and warehousing are best accommodated in areas of high freight activity where residential activity is minimal. Yet the delivery to the end consumer is increasingly resulting in considerations of truck traffic and livability.

At the **planning** stage, goods movement may lead to considerations of a layered transportation network and the establishment of “freight villages” that facilitate concentration of manufacturers, suppliers, and distributors in closer proximity minimizing total truck traffic. At the same time, aging industrial zones are increasingly being converted to residential uses due to changing market pressures in communities nationwide.

NCHRP Report 844, *Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments*, summarizes a wide range of strategies for accommodating goods movement demand and operations given the context of freight-sensitive land uses. The report is particularly helpful for communities in the process of transitioning from freight-intensive land uses to mixed uses.

The *Freight Roadway Design Considerations* document developed by Florida DOT provides guidance to transportation planning and engineering practitioners for balancing livability and goods movement needs in a context-sensitive manner. The Florida DOT document focuses on **roadway design**, providing guidance on identifying roadway context, understanding and



Goods movement is a critical function for all businesses in all land use contexts (© Renaissance Planning).

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$-
\$\$\$\$ and moderate to high level of effort

When? As needed

clarifying design intent, and selecting among a series of design strategies to help integrate goods movement into the development of Complete Streets. Design strategies for effective last-mile deliveries should extend to effective site development principles; in particular the increase in home-delivery services warrants consideration of loading zone capacity for multifamily residential properties.

The establishment of **operational** practices for effective goods movement includes both spatial and temporal considerations. From both spatial and temporal perspectives, curb space management plans are an increasingly popular approach to accommodating deliveries in urban areas:

- The City of New York has established variable mobile vendor license fees based on the desirability of the retail sales location.
- The Philadelphia Parking Authority established truck-parking only on retail streets from 6-10 AM, spaces revert to general retail parking at other times.
- Boston has embarked on a pilot program to include dynamic curb space parking for both passenger and commercial vehicles.

Effective freight planning benefits from considering a wide range of stakeholder perspectives, including goods movement companies (shippers and transporters), transportation system agencies, and both business and residential community stakeholders.

What are the Potential Benefits?

- **Safety and quality of life benefits:**
 - Improved freight first-mile and last-mile connections can decrease local operations and maintenance costs (e.g., curbs damaged by turning trucks).
 - Managed freight delivery can reduce unsafe maneuvers by delivery vehicle operators such as double-parking.
 - Reductions in truck traffic can improve air quality, noise, and traffic safety.

How Have Others Connected Their Communities?

The main street for the City of Zephyrhills, FL is Gall Boulevard (US 301). Through traffic, including trucks, disrupts community commercial activity. To remedy this, the city and Florida DOT have implemented a layered network and are transferring road ownership so that the city will take ownership of Gall Boulevard and US 301 will be rerouted to parallel routes more suited for through traffic. The newly designated US 301 will facilitate rear access to the commercial properties on main street to augment loading zone opportunities.

How Can I Get Started?

[FHWA Office of Freight Management and Operations](#)
[NCHRP Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments](#)

OI-3 Improved Transit Service expands communities' affordable transportation choices.

What is Improved Transit Service?

Improved transit service is any project or process that results in increased transit service, new transit service, or enhanced transit speed frequency. This strategy includes new transit services or transit infrastructure and covers any and all modes of public transit, including: buses, trolleys, light rail, subways, commuter trains, streetcars, cable cars, van pool services, paratransit services, ferries, water taxis, monorails, and tramways.

The Transportation Research Board's (TRB) *TCRP Research Report 187: Livable Transit Corridors: Methods, Metrics, and Strategies* offers a set of methods, metrics, and strategies embedded within a five-step visioning and improvement process that communities can use to achieve desired goals and outcomes, including:

- Increased transit ridership by creating consistent and connected stations in a corridor;
- Improved economic development opportunities beyond immediate station areas;
- Providing transit-accessible activities and opportunities that serve the full spectrum of community needs.

What are the Potential Benefits?

- **Access to opportunity** – results in greater transportation choices by providing new or improved transit services.
- **Economic return on investment**⁴⁹ – According to the American Public Transportation Association (APTA):
 - Every \$1 invested in public transportation generates approximately \$4 in economic returns.
 - Every \$1 billion invested in public transportation supports and creates more than 50,000 jobs.
 - Every \$10 million in capital investment in public transportation yields \$32 million in increased business sales.
- **Reduced household travel costs** – downsizing to one car can save a two-person household more than \$9,823 a year on average and potentially reduces carbon emissions by 30 percent.
- **Reduced congestion** – more people travelling by transit and fewer people travelling in single-occupancy vehicles results in less congestion.

Who Can Lead?

Planners, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$-\$\$\$\$ and moderate to high level of effort

When? As needed

⁴⁹ <http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx>

How Have Others Connected Their Communities?

Creating a dynamic public space and transit hub for improved transit connections and placemaking – Hennepin County, Minnesota used the success of its initial light rail investment and anticipated demand of the second line to win a TIGER grant. This grant allowed the County to build an intermodal connector that also serves as an iconic public space and connects the local community to regional destinations more effectively.

Launching better and more frequent service to increase ridership and choice – Lane Transit District replaced a popular bus line with a new bus rapid transit service – the Emerald Express (EmX) Green Line in Eugene, OR. This service improved frequency, headways, and travel times. Ridership went from 2,700 daily riders with the older service to over 11,000 in 2012.⁵⁰

Using road improvements to add significant transit infrastructure – The Washington State DOT added transit and high-occupancy vehicles lanes along with bicycle and pedestrians access elements on the SR 520 corridor near Seattle, WA. These improvements are expected to reduce typical peak-hour commutes between Seattle and the eastern side of the SR520 corridor by half an hour.

Optimizing the transit network to improve service with existing resources – StarMetro in Tallahassee, FL transformed its network from a hub-and-spoke system to match development, job centers, and travel needs more effectively. Although the number of routes was reduced from 26 to 12, they are longer and more efficient as cross-town, connected routes.⁵¹

How Can I Get Started?

[National Charrette Institute Charrette System Guide for Transit Oriented Development](#)

[Livable Transit Corridors: Methods, Metrics, and Strategies](#)

[American Public Transportation Association](#)

[Transit Cooperative Research Program](#)

[Streetsblog's 11 Simple Ways to Speed up your City's Buses](#)

⁵⁰ https://www.ltd.org/file_viewer.php?id=1212

⁵¹ <https://www.citylab.com/transportation/2011/09/tallahassee-bus-system/118/>

OI-4 Pilot Projects test new ways and ideas to connect communities and deliver strong transportation projects.

What are Pilot Projects?

A Pilot Project is a small scale preliminary study, project, or experiment conducted to evaluate feasibility, time, cost, adverse impacts, and benefits. In transportation, this term can also cover similar approaches such as:

- **Tactical urbanism** - low-cost, temporary changes to the built environment, usually in cities, intended to improve local neighborhoods and gathering places (also called “Do It Yourself” Urbanism).⁵²
- **Prototypes** - a preliminary model from which other forms are developed or copied.⁵³
- **“Lighter, Quicker, Cheaper”** - simple, short-term, and low-cost solutions that transform the shape of neighborhoods and communities.⁵⁴
- **Proof-of-concept** - realization of a certain method or idea to demonstrate its feasibility and verify its practical potential.⁵⁵

Who Can Lead?

Local or tribal government staff, Planners, Designers, Engineers, Program managers, Modal administrators

How Difficult? \$\$\$\$-\$\$\$ and low level of effort

When? As needed

While pilot projects can have numerous benefits, it’s important to understand the lessons learned through their implementation:

- **Results may vary:** Just because a transportation solution works in a pilot program, does not mean that it will be popular or efficient when deployed in a wider context. Make sure to involve all segments of the community in the pilot to avoid getting feedback from only a certain segment.
- **Prepare for pressure:** If a pilot project is successful, there may be a lot more pressure placed on it after it is put into wider use. It is important to understand how the project will scale, how it will be utilized, and how it should be marketed to ensure successful implementation and use beyond the pilot.

⁵² https://en.wikipedia.org/wiki/Tactical_urbanism

⁵³ <https://www.merriam-webster.com/dictionary/prototype>

⁵⁴ <https://www.pps.org/article/lighter-quicker-cheaper>

⁵⁵ https://en.wikipedia.org/wiki/Proof_of_concept

What are the Potential Benefits?

- **Risk management** – provides understanding of what might not work well on the ground.
- **Faster implementation** – provides an opportunity to work through logistical challenges on a smaller scale to identify potential issues.
- **Engaged audience** – determines if the solution works for stakeholders by testing with an engaged audience.

How Have Others Connected Their Communities?

Developing a method to select the best transportation project option. The Arizona DOT tested a Performance-Based Practical Design (PBPD) approach on SR 264 to determine the project alternative with the best value and determine if PBPD was a good approach for similar safety projects. Arizona DOT determined that one alternative had a lower overall cost and higher benefit-cost ratio and decided to expand PBPD for statewide use.

Determining true project need. The New York Power Authority piloted a two year-pilot road diet on the Robert Moses Parkway to see if community objectives could be met without a road redesign in the City of Niagara Falls, NY. Safety and emissions improved with minimal impact on travel time. However, this effort failed to address lack of integration with the local community and natural environment. As a result, the agency is now removing Robert Moses Parkway North in line with a larger community vision and redesign.

Testing cost-effective new ideas. Virginia DOT piloted tactical safety countermeasures with “the instant roundabout” in Loudoun County to address the high number of injuries and to improve the significant backups during rush hours at an intersection. This project successfully demonstrated the value of the roundabout. As a result, Virginia DOT determined that an operational version of the roundabout was acceptable for permanent installation.

How Can I Get Started?

[Wikipedia “Pilot Experiment”](#)

[13 Benefits of a Pilot Project](#)

OI-5 Shared Mobility Services combine new technology and shared modes to expand transportation choices

What are Shared Mobility Services?

Shared Mobility Services allow for the shared use of a vehicle, bicycle, or other mode so users can gain access to transportation on an as-needed basis. It includes various forms of carsharing, bikesharing, on-demand ride services, ridesharing (carpooling, vanpooling), and alternative transit services (paratransit, shuttles) that supplement fixed-route services.

While Shared Mobility Services are dynamic and gaining traction, they still face a number of challenges.

- There is a need for consistent public/private sector standards and definitions across all shared mobility service models. Agencies should develop definitions based on service rather than technological characteristics (e.g., apps).
- Another challenge is developing metrics, methodologies, and platforms that measure economic and travel impact of shared mobility (e.g., commute travel time, VMT). This can be addressed by developing activity-based travel demand models.
- It is vital that Shared Mobility Services are recognized as a key component of transportation policy and planning. This can be addressed by looking at developer and zoning regulations, allocating public rights-of way, and incorporating shared mobility into models, plans, and processes.
- There is a need to address potential accessibility issues so that services are broadly inclusive. This can begin to be addressed by providing multilingual marketing materials, exploring inclusive policies (e.g., incentives, tax credits), and utilizing alternative strategies for those who do not have smartphones, bank accounts, or credit cards.

Who Can Lead?

Local or tribal government staff, Planners, Engineers, Program Managers, Modal administrators

How Difficult? \$\$\$\$-\$\$\$\$ and low level of effort

When? As needed

What are the Potential Benefits?

- **Reduced vehicle use and ownership** – provides alternatives to riding alone in a private vehicle and can decrease the need to own a private vehicle.
- **Cost savings and convenience** – offers services that are more affordable and easier than owning a private vehicle, which can include car payments, insurance, registration, gas, and maintenance expenses.
- **Economic activity** – potentially spurs spending and business attraction/retention near public transit stations and multimodal hubs.

How Have Others Connected Their Communities?

Arlington County's Transit Development Planning with Capital Bikeshare – In October 2011, Arlington County began work on a long-term transit development plan (TDP). With the help of Capital Bikeshare, they worked to encourage multimodal integration. The TDP was finalized in November 2012 and helps to establish a strategy for successfully integrating bikeshare and public transportation within the county.

Roundtrip Carsharing in San Francisco, California – The San Francisco Municipal Transportation Agency (SFMTA) maintains an on-street carsharing parking program. Various carsharing programs, including City Carshare, Zipcar, and Getaround, all participate in the program, which designates up to 450 parking spots for carsharing vehicles. The program has several requirements including the following:

- Carsharing operator maintains a network of at least 10 vehicles.
- Vehicles are available 24 hours a day, seven days a week or available during garage hours.
- Car insurance is provided during a rental.
- Vehicles are rented in hourly increments or less.
- Vehicles are available for at least 75 percent of the time in any given month.
- Companies must do a new member outreach campaign and provide a summary of the outreach.
- Provide quarterly reports with numbers of new members and other operational data.
- Survey carsharing members to see changes in travel patterns over time.

Each organization can get up to 150 parking spaces (0.05 percent of the city's total on-street parking). The SFMTA Board of Directors decides their locations based on an application process that involves engineering reviews, community outreach, and approval. The monthly cost per space varies from \$50 to \$225, based on three demand zones created by SFMTA. Operators must pay a one-time installation fee of \$400. Each carsharing vehicle receives a special permit that exempts it from street sweeping, time limits, and other restrictions imposed on regular vehicles.

How Can I Get Started?

[FHWA Shared Mobility: Current Practices and Guiding Principles](#)

[Shared-Use Mobility Center](#)

[Shared-Use Mobility Reference Guide](#)

OI-6 Transit User Accommodations improve transit service quality for all users.

What are Transit User Accommodations?

Transit User Accommodations include investments that enhance the user experience through improved rider services or information, comfort enhancements, and affordability programs. These strategies focus on improving the transit rider experience.

Government agencies (such as the Federal Transit Administration) and professional organizations (such as the American Public Transportation Association) provide best practices for transit planning and operations. This guidance includes the following:

- Integrate transit and land use planning, pedestrian and bicycling improvements (for transit access), and Transportation Demand Management (TDM) programs that will provide incentives to use public transit.
- Consider transit agencies as “mobility service providers” rather than just bus operators; they should actively look for innovative ways to improve mobility and access, such as rideshare matching, vanpools, and Transit Oriented Development (TOD).
- Reflect on both mobility (i.e., improved travel choices for choice and dependent riders) and efficiency (e.g., reduced traffic congestion, road/parking facility cost savings, consumer savings, crash reductions, environmental protection).
- Implement innovative marketing techniques, price discounts, and new fare collection methods (e.g., “smart cards”) to attract new riders and make the process more efficient for those who already use the service.
- Consider the market segments that can be served by transit services, such as transportation options for those who are transportation disadvantaged and fast travel for urban commuters.
- Consider alternative transit services, such as paratransit and subsidized taxis, to provide mobility services in low-density areas.⁵⁶

Who Can Lead?

Planners, Designers, Engineers, Operators, Program Managers, Modal administrators, Community advocates/groups

How Difficult? \$\$\$\$-\$\$\$\$ and low to moderate level of effort

When? As needed

What are the Potential Benefits?

- **Improved ridership** – improves the rider experience, which can increase the number of people who choose to use a service and make the service better for those that are transit dependent.
- **Decreased headways/wait times** – reduces the amount of dwell time at stations through use of convenient fare payment systems and other improvements.

How Have Others Connected Their Communities?

⁵⁶ <http://www.vtpi.org/tdm/tdm47.htm>

Connected Bus uses new technologies to make transit more efficient – Cisco’s Connected Bus, in partnership with the San Francisco Municipal Transportation Agency (SFMTA), is a project that helps to standardize technological systems between transit equipment producers, operators, and users. It was started in 2007 as a part of the Connected Urban Development program at Cisco. It was created to encourage people in San Francisco to use the transit system by improving the quality of their ride. Examples of its services and technologies include the following: a mobile router network that integrates on-board systems (e.g., payment, security); real-time arrival information and passenger counts to help ensure adequate capacity and loading; and electronic payment systems to make travel more convenient and reducing dwell time.

How Can I Get Started?

[Victoria Transport Policy Institute Public Transit Improvements](#)

[Tri-Met Community Building Sourcebook](#)

[The Connected Bus](#)

CASE STUDIES

Introduction

The Federal Highway Administration's (FHWA) Community Connections program provides a way for transportation practitioners and stakeholders to engage communities more effectively, improve multimodal access for fuller lives, and streamline project delivery. This is accomplished by developing projects using the following core principles:

- Envision and plan with the community to understand their transportation needs.
- Approach projects holistically to consider all opportunities small or large, to improve communities through better transportation that leads to other desired community outcomes
- Consider the needs, security, and safety of all transportation system users.
- Build collaborative partnerships with traditional and nontraditional partners (e.g., interagency, multidisciplinary, State-local, public-private).
- Embrace innovation, technology, flexibility, creativity, and multimodal approaches to address each community's unique challenges, especially those that are performance-based.

This section provides a selection of 16 case studies that illustrate a variety of these principles and which emphasize the different ways to connect or reconnect communities through multimodal improvements and community revitalization efforts. The case studies presented in this document were selected through a consideration of the following criteria:

- At minimum, all projects have progressed beyond the planning phase and into the design phase; as of 2018, some of these projects are in the project development phase while others are under construction and some are fully operational.
- Projects represent a diversity of regions and neighborhood types.
- Projects illustrate a wide variety of the 26 tools featured in the Handbook, including ones from each of the four categories of tools including analytical tools and planning frameworks; public involvement strategies; project development and design techniques; and operational improvements and programs.
- Projects represent a variety of scales and approaches from highway transformation mega-projects to low-cost safety improvements.
- Projects demonstrate a commitment to the core principles of the Community Connections program outlined above.

As explored in the Handbook, Community Connections projects are categorized by four types – Invest, Renew, Restore and Repair. Table 1 below provides a definition and project example for each of these four types.

Project Type	 INVEST	 RENEW	 RESTORE	 REPAIR
Definition	Address a specific need or leverage a new opportunity to generate community benefits, irrespective of impacts associated with other prior or concurrent projects. Create community benefits through transportation infrastructure projects.	Address older projects at the end of their life cycle. Rehabilitate or reconstruct in manners that provide enhanced community benefits.	Alleviate or reverse adverse community impacts associated with recent transportation investments.	Reduce or offset potential adverse impacts associated with a new transportation project. Address community needs through project development mitigation.
Project Example	A streetscape improvement project defined as part of a community revitalization plan is an example of <i>Invest</i> .	A freeway teardown that replaces old and obsolete infrastructure with improved connectivity is an example of <i>Renew</i> .	A highway cap in an urban center is a <i>Restore</i> example, addressing unanticipated consequences of past transportation investments.	A new offsite transportation connection provided as part of an environmental stewardship program is a <i>Repair</i> example.

Table 1. Definitions and examples for each of the four Community Connections project types.

The map below (Figure 1) provides the physical location for each of the case studies and the National regions in which they are located. Table 2 provides the name of each project and the city or county and state in which the project is located; these projects correspond with the map by the project number associated with each. Finally, Table 3 indicates which of the 26 tools included in the Handbook were employed in each of the 16 case studies.

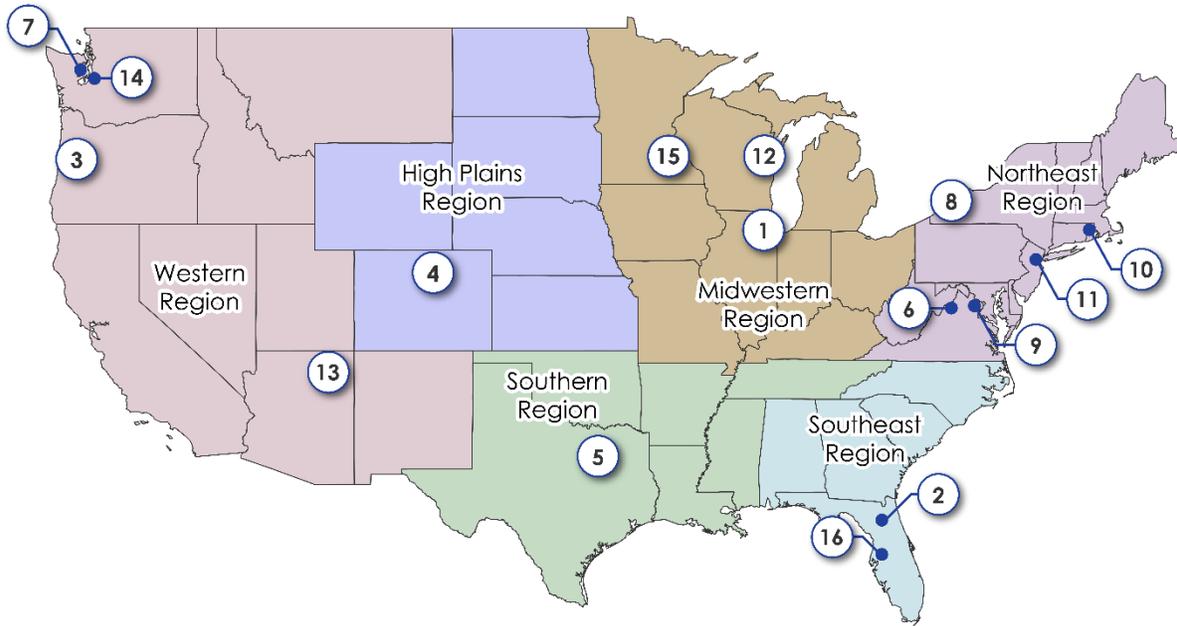


Figure 1. Location of case study projects by region and their associated project numbers.

PROJECT #	PROJECT NAME	CITY/COUNTY	STATE
1	41 st Bridge Pedestrian and Bike Bridge	Chicago	Illinois
2	Depot Avenue Multimodal Corridor	Gainesville	Florida
3	Emerald Express Green Line	Eugene and Springfield	Oregon
4	Federal Boulevard Improvements (West 5 th Avenue/Howard Place)	Denver	Colorado
5	Klyde Warren Park	Dallas	Texas
6	Luray-Hawksbill Greenway Trail	Luray	Virginia
7	Manchester Stormwater Park	Manchester	Washington
8	Niagara Scenic Parkway	Niagara Falls	New York
9	Poland/Edgewater Instant Roundabout	Loudoun County	Virginia
10	Route 6/10 Connector Project	Providence	Rhode Island
11	Route 18 Improvement Project	New Brunswick	New Jersey
12	State Route 54 and Duck Creek Bridge	Brown County	Wisconsin
13	State Route 264 Safety Improvements	Navajo County	Arizona
14	State Route 520 Eastside Transit and High-Occupancy Vehicle Program	King County	Washington
15	Target Field Station	Minneapolis	Minnesota
16	U.S. Route 301/Gall Boulevard Widening and Realignment	Zephyrhills	Florida

Table 2. List of case studies by project number, project name and location.

Tool/Project # Cross-Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Bicycle and Pedestrian Assessments	x	x					x									
Community Benefit Agreements																
Community Impact Assessments								x								x
Complete Streets		x						x			x					
Context Sensitive Solutions	x	x					x			x	x	x	x	x	x	
Design Charrettes			x											x	x	
EconWorks																
Environmental Justice/Equity Analyses	x			x												
Expanded Access to Transit			x	x	x									x	x	
Experiential Public Engagement																
Freight First-Mile / Last-Mile Connections																
Geographic Information Systems (GIS) Innovations										x						
Health in Transportation						x										
Improved Transit Service			x											x	x	
Performance-Based Practical Design													x			
Pilot Projects			x					x	x				x			
Planning and Environmental Linkages				x												
PlanWorks																
Road Diets		x					x	x								
Road Safety Audits		x														
Scenario Planning								x								
Shared Mobility Services																
Stakeholder Engagement			x	x			x	x			x					x
Transit User Accommodations			x											x	x	
Virtual Public Engagement		x		x	x		x									
Visualization Techniques		x	x					x		x	x					x

Table 3. Cross-reference matrix of Community Connections tools used in each project.

Case Study Format

Each of the 16 two-page case studies featured in this document follows the same basic format. In descending order, the darker blue text box at the top right of each case study provides the name of the project, the city and state the project is located in, and the project sponsor(s). Many of the 16 projects highlighted in this document featured a multitude of partners. Further, interagency collaboration and public-private partnerships are key components of the Community Connections initiative. However, due to space constraints, the project sponsors listed in this section are limited to the lead agency, land owner, and/or the primary funding entity.

The light blue Context box featured on the first page of each case study includes the following information for each project:

- The project's current phase of design or construction (as of 2018), or alternately, whether the project has been completed.
- The National region the project is located in.
- Whether the project is in an urban, suburban, or rural area.
- The physical size of the project (e.g., length in miles or square footage).
- The average annual daily traffic (AADT) or transit passenger volume served by the facility in question.

The body of the case studies are divided into the following four sections:

- *What was the Project Driver?* – this section provides a brief explanation of the impetus for the project and its primary objectives.
- *How did this Connect the Community?* – this section documents the specific set of challenges the project addressed and the steps that sponsoring agencies took to connect or reconnect communities through multimodal improvements and community revitalization efforts.
- *What were the Benefits?* – this section highlights the positive outcomes of the project including factors like economic benefits and awards the projects may have received.
- *For more information* – this section provides links to documents and other online resources that readers can use to learn more about the project.

Note that images in this document are intended to serve as examples of the range of real world existing conditions; they are not limited to best practices or approved designs and, in some cases, may reflect conditions that are not recommended.



41st Street Pedestrian and Bike Bridge

Chicago, Illinois

Chicago Department of Transportation

Counterclockwise from top: aerial renderings and up-close bridge visualization (© City of Chicago).

New bridge connects mixed-income housing and neighborhoods to the city and waterfront.

CONTEXT

- Construction to be complete in 2019.
- Midwestern.
- Urban.
- \$29 million.



URBAN/CITY TRAIL DEVELOPMENT

- Project adds new bicycle and pedestrian bridge over railroad tracks and major road.
- Bridge increases access between a historically disenfranchised community and lakeshore trail system.

WHAT WAS THE PROJECT DRIVER?

Residents on the North Side of Chicago have long enjoyed frequent and nearby access points to the Michigan Lakefront, but not so for the residents of the South Side. Some bridges have been renovated, but others, such as the one at 41st St, are completely new connections.

HOW DID THIS CONNECT THE COMMUNITY?

The 41st Street Pedestrian and Bike Bridge is a new investment that connects the Bronzeville neighborhood to the nearby Lake Michigan waterfront on the South Side of Chicago. It is one of five new or renovated connections in this part of town, aiming to develop the same waterfront access and **bike and pedestrian** experience in other parts of the City. The city hopes to eventually provide the previously isolated Near South Side with the same frequency of lakefront connections as the North Side—or roughly one every quarter mile.

When complete later in 2018, this Bridge will be fully accessible to individuals with disabilities, with ramps to accommodate bicycles, wheelchairs, and emergency vehicles. Not only does it go over Lake Shore Drive (an expressway), it also will span over

the Illinois Central rail tracks. In addition to connecting the neighborhood, it will also connect Lake Park Crescent, a new mixed-income housing project development built as part of the Chicago Housing Authority's Plan for Transformation, with Burnham Park and the Oakwood/41st Street Beach. The project benefitted from participation of the Chicago Park District and the Chicago Housing Authority (CHA). Selected through a design competition, the project is also meant

to create a specific place experience and mirror the meandering curves found in Chicago's older, Frederick Law Olmsted-designed parks

The planning for this project has been in the works for over 10 years and is grounded in its **context-sensitivity**. The 2016 draft Bronzeville Community Action Plan identifies this connection as a community priority and as part of a network of community planning initiatives in different topic areas – such as improving lakeshore access; supporting transit and transit-oriented development; enhancing housing access and affordability; revitalizing local retail; and expanding green neighborhood assets and activities. Furthermore, it builds on the great momentum of public and private investments throughout the community such as being part of the *Building on Burnham* plan to supporting citywide investments; additional bridge investments at other points nearby; a new grocery store; arts and recreation center; library upgrades; and waterfront shoreline reconstruction.



WHAT WERE THE BENEFITS?



When open, the project will provide better access to Chicago's lakefront for Bronzeville residents and will make walking and bicycling safer and more attractive for the 44-percent of residents who currently commute via walking, bicycling, or transit and the nearly 40-percent of Bronzeville households without a car. Access to this trail is an important economic enhancement for this community. More than 60,000 people a day currently use Chicago's Lakefront Trail as a direct and safe bicycle and pedestrian route connecting to downtown employment and education centers. Fifty percent of trail users report that they use the trail for transportation purposes in addition to recreation purposes.

The project itself will create 140 jobs during construction. It was also a 2014 Transportation Investment Generating Economic Recovery (TIGER) grant recipient for its innovative partnership with housing authorities and new access for bike commuting for a disadvantaged **environmental justice** community, receiving \$18.76 million in funding from the U.S Department of Transportation.

For more information:
<https://www.cityofchicago.org/city/en/depts/cdot/provdrs/ped/news/2017/june/mayor-emanuel-breaks-ground-on-41st-street-pedestrian-and-bike-b.html>
https://www.transportation.gov/sites/dot.gov/files/docs/TIGER14_ProjectFactSheets.pdf
<https://chicago.curbed.com/2017/6/6/15745676/chicago-construction-bronzeville-41st-street-bike-pedestrian-bridge>
<https://www.cityofchicago.org/city/en/depts/dcd/cnn/plans/bronzeville.html>



Depot Avenue Multimodal Corridor

Gainesville, Florida

City of Gainesville



Counterclockwise from top: the Depot Avenue Rail-Trail Pedestrian Bridge (Helyx Bridge) is a signature gateway to the corridor; Depot Park entrance; renovated train depot at Depot Park (all photos ©City of Gainesville).

The City of Gainesville's multimodal corridor provides key links to opportunities and amenities and supports concurrent redevelopment efforts.

CONTEXT

- Completed in spring 2018.
- Southeast.
- Suburban.
- \$15 million.
- 5,000+ AADT.
- 1.73 miles.

COMPLETING THE STREET

- Provides multimodal access to a major university, hospital, regional transportation hub, and rail-trail network.
- Iconic bicycle-pedestrian bridge is a signature gateway to the corridor.
- Incorporates numerous aesthetic and placemaking elements.

WHAT WAS THE PROJECT DRIVER?

Gainesville was once a rail hub for the North Central Florida region. However, by the late-20th century, rail operations had ceased and the town's train depot had fallen into disrepair. In 1997, the City of Gainesville won a US EPA Brownfield pilot grant to remediate industrial pollution at the depot site. Despite its proximity to a university, a hospital, and the city's downtown, the neighborhood surrounding the depot also showed signs of neglect, as seen in the deteriorating condition of its roadways and buildings. Plans to renovate the depot and turn the remediated Brownfield site into the city's Central Park served as a catalyst for the Depot Avenue Transportation Corridor Study and the City's efforts to revitalize the area surrounding Depot Park.

HOW DID THIS CONNECT THE COMMUNITY?

Bicycle and pedestrian assessments and **road safety audits** helped determine the corridor's deficiencies. **Road diets** and **Complete Streets** treatments were identified as needed improvements. Through **context sensitive solutions**, the City also incorporated area residents' feedback in the development of the corridor's design and aesthetic elements. These elements include decorative lighting and brick sidewalks that improve bicycle-pedestrian safety and complement surrounding land uses. As part of its public engagement program, the City also employed **virtual public engagement** and unique **visualization techniques** including the use of 3D rendering fly-throughs to communicate the project scope, including its alignments and amenities.



Depot Avenue and the historic train depot during its renovation (©City of Gainesville).

The fourth and final segment of the Depot Avenue multimodal corridor was completed in spring of 2018. The corridor provides enhanced multimodal connectivity between the historic Cotton Club neighborhood, Depot Park, the historic Porter's neighborhood, high-density student residential housing, medical facilities, and the University of Florida – one of the nation's largest universities by student enrollment. The corridor also provides **expanded access to transit** by connecting to the Rosa Parks Downtown Transit Station – a hub for local and intercity buses.

Further, the corridor links two of the region's shared-use rail trails. The Gainesville-

Hawthorne State Trail provides off-street bicycle and pedestrian access to nearby Paynes Prairie State Park and the neighboring town of Hawthorne. The Depot Avenue Rail Trail runs parallel to the Depot corridor and links the University with a number of residential neighborhoods. These two rail-trails intersect at Depot Park.



Depot Park playground (©City of Gainesville).

In 2012, the City completed modification of a former railroad bridge to create a signature bicycle-pedestrian gateway between the University and multimodal corridor. The award-winning design of the Helyx Bridge features a simulated railroad track twisted into the shape of a brightly colored DNA strand. This design references both the area's rail history and the City's contemporary role as home to leading scientific research institutes.

WHAT WERE THE BENEFITS?



The project links a number of formerly disjointed sections into a single multimodal corridor with a focus on bicycle-pedestrian connectivity and aesthetics elements that include decorative lighting and sidewalk treatments. The corridor also provides an important foundation for the City's efforts to improve the economy and livability of surrounding neighborhoods.

Awards: American Public Works Association, Project of the Year (Transportation, structures under \$5 million): Depot Avenue Rail-Trail Pedestrian Bridge

For more information:

<http://www.gainesvillepublicworks.org/projects/depot-avenue-segment-4-2/>



Emerald Express Green Line

Eugene and Springfield, Oregon

Lane Transit District

Counterclockwise from top: EmX at station (© 2013, Lane Transit District); EmX riders (© 2011 Wolfram Burner); Double-sided boarding (© 2015 Bryan Costale).

A new transit line helps improve active transportation options and access to economic centers.

CONTEXT

- Constructed in 2007.
- Western.
- Urban.
- \$25 million.
- 4-mile corridor from Eugene to Springfield.
- 10,000 daily riders.



INTEGRATED BUS RAPID TRANSIT (BRT)

- First leg in a regional bus rapid transit (BRT) network vision.
- Exclusive right-of-way (ROW) and limited stops.
- Holistic transit and active transportation connections.

WHAT WAS THE PROJECT DRIVER?

As part of the update process of the regional long-range transportation plan, the Lane Council of Governments identified bus rapid transit with upgraded bus infrastructure and service as a key strategy to address anticipated congestion between Eugene and Springfield.

HOW DID THIS CONNECT THE COMMUNITY?

The purpose of the Emerald Express (EmX) was to **improve transit services** and active transportation connections. At the time, it was one of the first BRT systems in the United States. The EmX characteristics include exclusive bus lanes, transit signal priority, high-capacity vehicles with near-level boarding, transit signal priority, widely spaced stations, off-board fare collection, and short headways.

The first corridor project, the Green Line, was designed as a **pilot project** to increase transit ridership through reduced travel time and increased reliability through exclusive ROW, fewer bus stops, and improved boarding and exiting processes and rider amenities. The 4-mile route connects downtown Eugene and downtown Springfield, the two main hubs along the Franklin Corridor. The Franklin Corridor also serves the

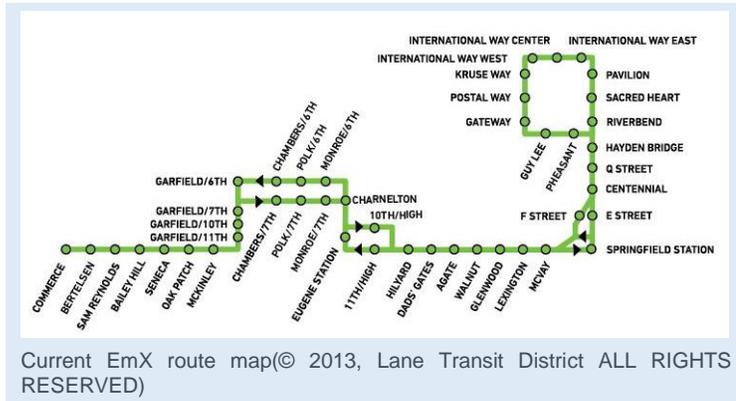
key economic centers such as the University of Oregon and Sacred Heart Medical Center.

The EmX project also incorporated bicycle improvements, landscaping, new sidewalks, and traffic enhancements – all meant to support improved local active transportation access. The service also features double doors, which was a critical **transit user accommodation** that provided **expanded access to transit** by facilitating bicycle-on-bus accommodations and faster boarding.

The community was involved in the corridor design process. There was an effort to communicate and engage with every business owner and resident located along the corridor to discuss the system concept and get feedback. Multiple **design charrettes** and open houses were held to get input on the design and implementation of the system and were supplemented by **stakeholder engagement** working groups that included elected officials. **Visualization techniques** have been identified as a key to the project's success, particularly in demonstrating to how the project would look and function. It was essential in gaining community support as well as keeping Lane Transit District (LTD) employees engaged throughout the process.

The Green Line replaced one of LTD's most popular bus routes, which originally served about 2,700 daily riders. In 2012, several key ridership milestones were surpassed as EmX carried 11,258 boardings on April 10 of that year and averaged more than 10,000 weekday boardings the same month.

During the original BRT network planning, LTD envisioned a system of BRT corridors that could



be built in stages, to match funding availability and ridership demand, at much lower cost than light rail. The success of the Green Line helped demonstrate the value of the rest of the network. This progression has occurred as LTD has opened two additional corridors: The Gateway EmX and the West Eugene EmX. In addition to the features of the Franklin corridor, these corridors also included advances in green infrastructure like rain gardens, public art, and improved intersections.

WHAT WERE THE BENEFITS?



Transit service headways have been reduced to 10 minutes, compared to the previous 15-30-minute headways on the old route. The EmX has increased travel speed from 11 mph to 15 mph, and improved service reliability.

Awards:

- 2008 Sustainable Transport Honorable Mention from the Institute for Transportation and Development Policy, the only one in the United States.
- BRT Standard Bronze award in 2013.
- Highlighted in the Federal Highway Administration's Livability in Transportation guidebook.

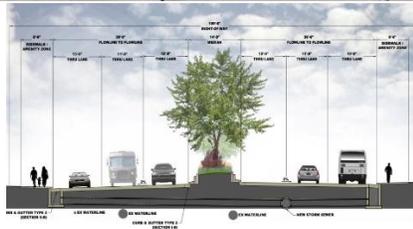
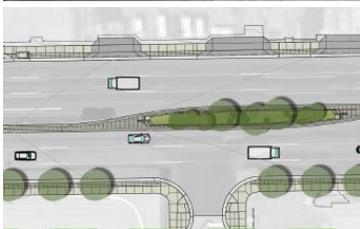
For more information:
https://www.fhwa.dot.gov/livability/case_studies/guidebook/appendix/app07.cfm#foot27
<https://www.ltd.org/emx-west/> and https://www.ltd.org/file_viewer.php?id=2476
<https://www.itdp.org/itdp-awards-eugene-oregons-emx-line-bronze-brt/>
https://www.transit.dot.gov/sites/fta.dot.gov/files/EmX_FranklinCorridor_BRTProjectEvaluation.pdf



Federal Boulevard Improvements (West 5th Avenue / Howard Place)

Denver, Colorado

City and County of Denver



Counterclockwise from top: View along Federal Boulevard, map of landscape median improvements; cross section of boulevard (© 2014 City & County of Denver).

A comprehensive design process led to multimodal safety improvements in a busy and dangerous segment of a commercial corridor.

CONTEXT

- Under construction in 2018.
- High Plains.
- \$34 million.
- 1-mile segment of Federal Boulevard.
- 30-40,000 Annual average daily traffic.



COMPLETING THE STREET

- Busy commercial corridor, north-south link; 2nd-highest transit ridership in the city.
- Improved sidewalks, median landscaping for safety, and transit improvements.
- Part of larger corridor plan; public social media campaign.

WHAT WAS THE PROJECT DRIVER?

Due to high speeds and daily vehicle volume, six lanes of traffic, lack of intersections/crosswalks, and a discontinuous sidewalk system, a one-mile stretch of Federal Boulevard in Denver (between 5th Avenue and Howard Place) had fatality and injury crash rates more than three times the statewide average.

HOW DID THIS CONNECT THE COMMUNITY?

The Denver Department of Public Works (DPW) led the task of addressing these major safety concerns through improvements that serve all modes with the focus of enhancing multimodal connectivity and safety.

The project team prioritized the need for a **Planning and Environmental Linkages (PEL)** study in the early stages of the project. The 2009 PEL study conducted for this segment included a purpose and need statement, consideration of environmental impacts, and a review of possible alternatives. The study found that many pedestrians and bicyclists had difficulties crossing the roadway, due to:

- The discontinuity of sidewalks along the corridor.
- The presence of many curb cuts and driveways
- A lack of crosswalks.
- Lengthy stretches of roadway without intersections and signals.

All of these factors led to unsafe conditions and crashes. Additionally, there is a planned Federal/Decatur light rail station at Howard Place, which contributes to a forecast increase in daily traffic volumes by approximately 30 percent by 2035, with additional pedestrian and bicyclist activity also expected. The PEL study helped the DPW identify and decide the project action to prioritize the necessary multimodal improvements.

Additionally, the subsequent Environmental Assessment (EA) found that over 40 percent of the residents in the adjacent neighborhoods of Sun Valley and Villa Park use public transit to get to work. The EA determined that there is a large reliance on the corridor's pedestrian and bicycle facilities to provide **expanded access to transit**.

DPW conducted public involvement activities for the PEL study and continued during the EA. The project included opportunities for participation in the decision-making process as well as targeted outreach efforts to the **environmental justice** populations in the neighborhoods adjacent to the corridor.

Tools including **stakeholder engagement** and **virtual public involvement** were used to elicit

ideas from a wide range of community members. These included:

- Presentations and translation services to small groups (identified need for Spanish and Korean translation).
- Distribution of flyers at neighborhood meetings.
- Continued project updates to the webpage and social media sites.
- Interviews of property and business owners in the project area.

Set to begin construction in late 2018, the project will better enhance the connectivity of this heavily traveled corridor through the following design improvements:

- Reconfiguring Federal Boulevard to provide intersection turn lanes instead of a two-way turn lane.
- Widening the sidewalk from 5 feet to 8 feet, as well as providing accessible curb ramps and driveway cuts.
- Adding a raised median with landscaping as a buffer.
- Adding signage and pedestrian-scale lighting for the nearby Weir Gulch Trail.

WHAT WERE THE BENEFITS?



RESTORE

The improvement project is anticipated to reduce crashes along the corridor and create a safer and more efficient thoroughfare for pedestrians and drivers alike.

For more information:

<https://www.denvergov.org/content/denvergov/en/denver-department-of-public-works/projects/current/federal-blvd-5th-howard.html>

<https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/PolicyPlanning/Current Projects/>

[FederalBlvd_5thtoHoward/Federal%20Public%20Meeting%20.pdf](https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/PolicyPlanning/Current Projects/FederalBlvd_5thtoHoward/Federal%20Public%20Meeting%20.pdf)

<https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/PolicyPlanning/Current Projects/>

[FederalBlvd_5thtoHoward/Presentation%20Street%20Layout_10_25_2011.pdf](https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/PolicyPlanning/Current Projects/FederalBlvd_5thtoHoward/Presentation%20Street%20Layout_10_25_2011.pdf)



Klyde Warren Park

Dallas, Texas

Texas Department of Transportation and Klyde Warren Park



Counterclockwise from top: View of completed park (©OJB Landscape Architecture, Thomas McConnell); arched walkway (©OJB Landscape Architecture, Mei Chun Jau), before construction picture (© Klyde Warren Park)

Through a public private partnership, a freeway overpass was transformed into an urban oasis that functions as both a connection and a destination.

CONTEXT

- Constructed in 2012.
- Southern.
- Urban.
- \$110 million.
- 0.2 miles of covered freeway as part of a 5.2-acre park.



HIGHWAY TRANSFORMATION

- 5-acre deck park over recessed eight-lane freeway, linking uptown and downtown Dallas.
- Flexible outdoor space supporting year-round use.
- Generated over \$1B in economic benefit for the neighborhood.

WHAT WAS THE PROJECT DRIVER?

The Uptown and Downtown Arts District neighborhoods in Dallas, TX were separated by the eight-lane Woodall Rodgers freeway. The key mission was to connect these neighborhoods and increase foot traffic downtown in hopes of also increasing adjacent real estate demand and property values.

HOW DID THIS CONNECT THE COMMUNITY?

Ideas about creating a covered deck design over the highway had been considered since the freeway was built in the 1960s. Although the freeway was constructed without a deck, developers in the early 2000s wanted a way to better connect the amenities the area had to offer. The concept of the deck was revived, and local developers began working on a feasibility study and preliminary design concept for a park. A Real Estate Council grant of \$1 million was awarded to determine the feasibility of constructing a park of this scale. Once deemed



Overlay of park (Source: OJB Landscape Architecture).

feasible, construction began in 2009 and completed in 2012. It was funded through a public private partnership that included \$20 million in bonds from the City of Dallas, \$20 million from state highway funds, \$16.7 in American Recovery and Reinvestment Act funding, and the remainder through individual donors to the Park Foundation

The park has ample bike racks, bike paths, walking paths, and crosswalks that facilitate **expanded access to transit**. There is also direct access to various modes of local transportation such as the McKinney Avenue Trolley park stop, two Dallas Area Rapid Transit stops within walking distance, and special service bus line through downtown Dallas.

The park's entrances are built accessibly at-grade, with no need for stairs. Through the park, there are 18-foot-wide crosswalks with signage to direct park visitors to and from the adjacent parking garages, bus stops, and neighborhoods. The park includes numerous gardens, a restaurant and cafe, water features, and public restrooms. The park is also frequently used for events, with a permanent, structured band shell that overlooks the main event lawn. The event programming list includes free concerts, shows, and regular fitness classes.

For more information:

- <https://www.klydewarrenpark.org/About-the-Park/index.html>
- https://www.fhwa.dot.gov/environment/environmental_excellence_awards/eea_2015/page04.cfm
- <https://www.dmagazine.com/commercial-real-estate/2015/08/how-klyde-warren-park-has-changed-dallas-real-estate/>
- <http://landscapeperformance.org/case-study-briefs/klyde-warren-park>

In employing **context sensitive solutions**, Klyde Warren Park was constructed with civic, economic, and environmental needs in mind, resulting in a well-received project.

The project also involved robust **virtual public engagement** through a social media campaign that garnered interaction that led to over 14,000 Facebook 'likes,' 5,000 'tagged' photos and almost 10,000 Twitter and 959 Instagram followers within the first 6 months.

WHAT WERE THE BENEFITS?



RESTORE

Since opening in 2012, nearby lease rates have increased dramatically; some as high as \$52 per square foot. The Landscape Architecture Foundation projected that this project will generate \$312.7 million in economic development and \$12.7 million in tax revenue. This new development will contribute to a projected 8.8 percent population increase nearby and to a 61 percent increase in ridership on the M-Line trolley, which connects downtown and uptown.

Klyde Warren Park is a nationally-recognized highway transformation, resulting in a park where, for example, employees in the area can meet for a lunch at one of the many food trucks and sit under a shaded bench, or take a walk from their office uptown, through the park and to the Dallas Museum of Art located downtown. The awards this park has received are also a testament to its success:

- 2015 Citation of Honor Texas Society of Architects.
- 2014 Urban Land Institute Urban Open Space Award Space Award, 2014.
- 2015 FHWA Environmental Excellence Award - Excellence in Context Sensitive Solutions.
- 2018 Collaborative Achievement Award American Institute of Architects.



Luray-Hawksbill Greenway Trail

Luray, Virginia

Town of Luray

Counterclockwise from top: Hawksbill Greenway; Hawksbill Creek; Greenway users (all photos ©Hawksbill Greenway Foundation).

A creekside greenway combines a lush habitat for wildlife with healthy transportation and recreation opportunities for residents and visitors.

CONTEXT

- Completed in 2008.
- Southeast.
- Rural.
- \$3.5 million.
- 4 miles.



URBAN/CITY TRAIL DEVELOPMENT

- New open space and improved access to amenities.
- Enhances connectivity between the downtown area and residential districts.
- Provides valuable health and recreational benefits, including access for individuals with disabilities.

WHAT WAS THE PROJECT DRIVER?

Hawksbill Creek is the gateway to Luray – a town of fewer than 5,000 in Virginia’s Shenandoah Valley. For much of the last century, this waterway was polluted by agricultural and industrial runoff, and over time the creek’s banks grew unsightly and inaccessible. In 1999, the town’s Director of Parks and Recreation attended a State conference on greenways and trails. Soon afterward, he presented his concept for a paved bicycle-pedestrian path alongside the creek to the Mayor and Town Council, who voiced their support. The Virginia Department of Forestry (VDOF) and the Virginia Department of Conservation agreed to provide technical and financial assistance on the condition the Creek be assessed for pollution control and improvements to fish habitats. Additionally, the

project received more than \$300,000 in support from the Federal Highway Administration's Recreational Trails Program.

HOW DID THIS CONNECT THE COMMUNITY?

With the Town Council's approval, a landscape architect was hired for less than \$10,000 to develop a conceptual design plan for the proposed greenway. At a public hearing, residents expressed their wholehearted approval of this plan, and the Council recommended to proceed with construction of the Luray-Hawksbill Greenway Trail.



Murals from local artists and schoolchildren line the Greenway (©Hawksbill Greenway Foundation).

The final phase of the Greenway was completed in 2008. This pathway borders a number of local businesses and crosses Main Street in the center of Luray's vibrant downtown area. The Town coordinated with the Virginia Department of Transportation (VDOT) to ensure the new bridge replacement would provide adequate vertical clearance for the greenway and allow for unimpeded travel. Additionally, the Greenway provides enhanced bicycle-pedestrian access to and from adjacent residential areas, including a number of historic neighborhoods. The Greenway also connects to the town's restored train depot, which houses Luray's Visitor Center and a Railroad Museum.

Since its construction, the Greenway has become very popular with local joggers, walkers and bicyclists, offering valuable **health in transportation** benefits. In fact, one of the town's residents lost over 100-pounds by walking the Greenway. Further, the Greenway is

accessible to individuals with disabilities, offering an opportunity to enjoy the Greenway's many benefits.



Pocket park (©Hawksbill Greenway Foundation).

As the Greenway construction began, the town undertook a parallel effort to mitigate creek pollution. Working with the VDOF and local farmers, the town established a riparian buffer between the creek and adjacent cattle grazing field. Volunteers from local groups donated their time to help plant over 3,000 seedlings in this buffer zone. Through this effort, the creek's waters have become much cleaner and the creek has been designated a Virginia "Class A" trout stream. To take advantage of this amenity, the Town provided accessible fishing platforms along the greenway and hosts a popular annual Youth Trout Fishing Tournament there.

WHAT WERE THE BENEFITS?



By enhancing connectivity to local businesses and amenities, the Greenway has helped the town become a true "walking community."

By creating shared recreational opportunities and bringing members of the community together in an effort to beautify the surrounding areas, the Greenway has also strengthened Luray's social fabric. Further, it has served as a direct catalyst for the creation of dozens of murals along the Greenway and a number of nearby pocket parks.

Awards:

Virginia Downtown Development Association, Award of Excellence (2007).

For more information:

<https://hawksbillgreenway.org/>



Manchester Stormwater Park

Manchester,
Washington

Kitsap County

Counterclockwise from top: Overhead view of completed park (John Aitchison, kitsap.biz), Spiral rain garden feature (Northwest Cascade Inc. All Rights Reserved); full park under construction (©Kitsap County Public Works).

An innovative stormwater management system doubles as a park and was designed to reflect the recreational and nature-loving character of this community by the shore.

CONTEXT

- Constructed in 2015.
- Western.
- \$4 million.
- 0.5-acre park.



STORMWATER MANAGEMENT INITIATIVES

- Retrofitted a brownfield site into a stormwater treatment site.
- Creating better outcomes through interagency collaborations.
- Improved pedestrian access and traffic flow as part of a stormwater retrofit.
- Retaining community character with an innovative park design.

WHAT WAS THE PROJECT DRIVER?

The Puget Sound region has been experiencing population and development growth, thus raising concerns about pollution and environmental impacts. Manchester's Main Street-Colchester drainage basin was at the top of a countywide list of stormwater retrofit project sites, due to its "end of pipe" location along the Puget Sound shoreline, meaning it drained directly to the Sound. In addition to addressing stormwater treatment needs, the Manchester Stormwater Park also functions to alleviate the typical winter flooding in the village.

HOW DID THIS CONNECT THE COMMUNITY?

The Kitsap County Public Works Department worked in partnership with the Washington Department of Ecology (WA-DOE) to initiate the Manchester Community Stormwater Retrofit Plan to improve the quality of the runoff flowing directly into distribution channels and to nearby Pomeroy Park, a popular shore site for swimming and sailing. Manchester is among the many small communities in the region that have experienced population growth leading to additional traffic and

pollution, causing a strain on the community's ecology. The site of the retrofit was a brownfield site and a vacant lot that was formerly a gas station. Kitsap County transformed the lot into a stormwater treatment site that doubled as a walkable and bikeable community park.

As the community's center and core gathering space, the County tied this retrofit with some much-needed safety improvements. To help calm traffic along the park at Colchester Drive and East Main Street and improve bicycle and pedestrian safety, the County constructed a row of back-in only diagonal parking -- a **road diet** technique to increase driver awareness.



Completed park walkway (©Kitsap County Public Works).

Context sensitive solutions were a primary focus for the project team. In working closely with the community, the County designed a park that aligned with the community's natural and recreational ethos. A **bicycle and pedestrian assessment** aided the team in creating extended paths and updating signage and lighting connecting Manchester Stormwater Park and Pomeroy Park. Bike racks were also installed along East Main Street.

A main design feature is a spiral rain garden filtration system that also is a sculptural centerpiece for the park. It treats the water before it reaches the Sound. The Department of Public Works expects a total removal of over 100,000 pounds of materials related to pollution in the next 20 years.

In response to community feedback Kitsap County used a comprehensive **stakeholder engagement** process to collect input and build support. Public involvement efforts included:

- Upfront communication about project impacts and the completion schedule.
- On-site signage and **virtual public engagement** through social media and website updates.
- Community meetings to communicate project issues and mitigation procedures.

Through this consistent coordination, residents of Manchester voiced their desire for a design that would reflect the community's character, while taking advantage of the views of the Puget Sound. Residents also wanted an open-space area that could be used as a gathering space for various events.

WHAT WERE THE BENEFITS?



RENEW

The development of this park has been recognized both as an innovative approach to a rehabilitate a vacant space into a stormwater treatment facility and as a well-regarded community space. On a half-acre parcel, this park is smaller than most stormwater treatment areas and also serves as a model for similar communities with limited space. Overall, the entire project adds a half-mile of pedestrian walkways.

In April 2016, this project was selected by the America Council of Engineering Companies for an "Honor Award" presented at the 2016 Engineering Excellence Awards Gala. The Manchester Stormwater Park project was also highlighted in an article in the May 2016 edition of Stormwater - Journal for Surface Water Quality Professionals.

For more information:

<http://kitsap.paladinpanoramic.com/project/2231/44030>

<https://www.kitsapdailynews.com/news/manchester-stormwater-project-to-help-clean-up-puget-sound/>

<https://nwcascade.com/manchester-stormwater-park/>



Parkway currently (©New York State)

Niagara Scenic Parkway

City of Niagara Falls, New York

New York Power Authority

Removing a parkway helps reconnect neighborhoods with natural wonders and the city.

CONTEXT

- Under removal.
- Northeast.
- Urban.
- \$42 million.
- 2 miles.
- Less than 200 vehicles in either direction during peak hour.



HIGHWAY TRANSFORMATION

- Removal of 2 miles of parkway and replacing with open spaces and a trail network.
- Linking isolated green spaces into an unbroken green corridor along the Niagara Gorge rim.

WHAT WAS THE PROJECT DRIVER?

The Robert Moses Parkway was part of a larger planned park and expressway network intended to connect nearby parks, communities, and attractions, as the region grew. However, much of the network remained unbuilt and unneeded as projected growth did not materialize. It was underutilized and a barrier to the waterfront. The local community identified the parkway as an economic impediment as well.

HOW DID THIS CONNECT THE COMMUNITY?

The New York Power Authority, as part of a multi-agency effort, is funding the removal of a two-mile stretch of the Robert Moses Parkway North that provided expressway access to the Niagara Gorge rim – the ultimate **road diet**. In its place is a new trail system that provides new open space, waterfront access, and scenic overlooks. It will now be known as the Niagara Scenic Parkway. It will also include the reconstruction of the parallel roadway, Whirlpool Street, into a two-lane **Complete Street** as the primary access to the Niagara Gorge Corridor. This will help create a “Gorge-front” boulevard between the commercial areas and natural resources nearby.

This project is the culmination of multiple planning studies on **community impacts**, such as the 2005 Downtown Niagara Falls Multimodal Access Program, 2006 Niagara River Greenway Vision, 2009 City of Niagara Falls Comprehensive Plan, 2010 Niagara Gorge Corridor project, a 2011 Regional Economic Development Strategic Plan, and 2014 Neighborhood **Scenario Planning** and Visioning process.

It also benefited from a two-year **pilot project** in 2000 to study the effects of reducing the Robert Moses Parkway to one lane in each direction. Travel time in the corridor increased by only two minutes while crashes and emissions were reduced. However, this pilot did not address the parkway's expressway features blocking access between the Niagara Gorge and adjoining City neighborhoods.

During the project scoping process of the 2010 Niagara Gorge Corridor plan, many different community and **stakeholder meetings** were held. Stakeholders were grouped in different ways: municipal representatives, elected officials/public agencies, and cultural, commercial, and environmental groups. During a subsequent environmental process with community groups, many were engaged from general public open houses to targeted ones for the Whirlpool Street neighborhood, nearby Niagara Falls Housing Authority locations, and with nearby tribal nations. The project also continues longstanding collaboration between the New York Power Authority (landowner), the New York Office of Parks, Recreation & Historic Preservation (land manager), and the New York Department of Transportation (co-project sponsor) and others such as the City of Niagara Falls, Federal Highway Administration, and the USA Niagara Development Corporation. In all



Existing view looking south



Artist rendering looking south

Existing and Proposed Redesign (©New York State)

cases, different **visualization techniques** were used, such as renderings, photo simulations, design concepts, and traffic video simulations.

WHAT WERE THE BENEFITS?



RESTORE

From a transportation perspective there was 50 percent more roadway capacity than was needed.

Over 300 acres of green space will be opened up and will link the Niagara River Gorge and Falls into a single destination to allow easier access to the water's edge. It is the largest expansion of green space since the Niagara Reservation was designated in 1885.

For more information:

<https://www.governor.ny.gov/news/governor-cuomo-announces-42-million-project-remove-two-mile-stretch-robert-moses-parkway> and
<https://parks.ny.gov/inside-our-agency/public-documents.aspx>



Poland / Edgewater Instant Roundabout

Loudoun County, Virginia

Virginia Department of Transportation



Counterclockwise from top: Temporary "instant" roundabout from two different perspectives; aerial of intersection (©Virginia Department of Transportation).

A pilot project improved intersection safety with an "instant roundabout".

CONTEXT

- Constructed in 2012.
- Southeast.
- \$90,000.
- 3,600-3,900 Annual Average Daily Traffic.



SAFETY+ IMPROVEMENTS

- Responded quickly to a serious crash/injury problem.
- Low cost makes it replicable for other agencies.
- Promoted as part of Every Day Counts-2 for intersection and interchange geometrics.
- Demonstrates agency dedication to the public and to financial stewardship.

WHAT WAS THE PROJECT DRIVER?

The intersection of Poland Road (Route 742) and Edgewater Street in Loudoun County, Virginia is a key point of access within the South Riding community, located between the Little River Elementary School and a community recreation center. The two-way stop-controlled intersection was the site of an average of nine crashes per year as increasing development and rising traffic volumes in the area were contributing factors. Local officials and the community wanted an immediate and efficient fix to prevent the high number of injuries and to improve the significant backups during rush hours. The construction of an "instant roundabout," a temporary roundabout built using off the shelf materials, took only six days and cost less than a permanent roundabout.

HOW DID THIS CONNECT THE COMMUNITY?

After local officials voiced concerns about the safety of the intersection, the Virginia Department of Transportation (DOT) staff presented their idea for the planned instant roundabout **pilot project** at public information meetings. Before moving



Top: View of Poland Road and Edgewater Street intersection's "instant roundabout" (@Virginia Department of Transportation). Bottom: Intersection in 2012 (Original Photo: ©2015 Google®)

forward with the construction, meetings were facilitated by Loudoun County elected officials, and attended by local homeowners' associations including Ridings at Blue Springs Homeowners Association, and by organizations like the South Riding Proprietary Board of Directors.

The Poland Road and Edgewater Street roundabout was both quick and inexpensive to construct because it used existing, on-hand materials in a creative manner. Virginia DOT engineers used materials such as tubular markers and plastic curb sections. The temporary

roundabout cost only \$90,000, about 5 percent of the cost of a traditional roundabout. Three years after the installation, crashes were reduced by 89 percent. The roundabout also effectively reduced traffic delays, as motorists previously had waited up to three minutes to get through the intersection. The pilot project itself served as a community engagement initiative as the ability to quickly demonstrate the safety and accessibility benefits of the roundabout helped garner support for the treatment as a permanent solution.

WHAT WERE THE BENEFITS?



This project prioritized safety while creating an innovative, immediate, and cost-effective solution to a dangerous roadway. In addition to the safety improvements, the intersection experienced efficiency in the traffic flow with better movement without stops and traffic signals.

Due to the significant success of this instant roundabout demonstrated over the course of several years, Virginia DOT moved forward with installation of a permanent structure in 2018.

This project was recognized with the National Roadway Safety Award in 2017 by the Roadway Safety Foundation and the Federal Highway Administration for its safety achievement focusing on minimizing traffic death and injuries.

For more information:

http://www.virginiadot.org/projects/northernvirginia/poland_road_and_edgewater_street.asp

[http://www.virginiadot.org/newsroom/northern_virginia/2018/poland_road_roundabout_pardon126251.a](http://www.virginiadot.org/newsroom/northern_virginia/2018/poland_road_roundabout_pardon126251.asp)

<https://safety.fhwa.dot.gov/roadwaysafetyawards/2017/npg2017.pdf>





Route 6/10 Connector Project

Providence, Rhode Island

Rhode Island Department of Transportation

Counterclockwise from top: study area, visualization of Westminister bridge, and temporary but longstanding bridge support (©Rhode Island Department of Transportation)

Rightsizing highways can prompt redevelopment and provide active transportation assets.

CONTEXT

- In design, construction planned for 2023.
- Northeast.
- Urban.
- \$410 million.
- 1.6 miles.
- 100,000+ vehicles daily served.



HIGHWAY TRANSFORMATION

- New significant bike and pedestrian connections.
- Bridge replacement and demolition.
- New redevelopment opportunities through returned land.

WHAT WAS THE PROJECT DRIVER?

Interchanges and bridges along Interstate 95 in downtown Providence have reached the end of their lifespan. This project addressed a need to replace seven structurally deficient bridges. Temporary supports were installed over 15 years ago and over \$5 million/year has been spent in a series of repair projects necessary to keep the highway safe and open. Although the need had been well-documented, a solution has been elusive over the past 30 years as many different design options have been explored.

HOW DID THIS CONNECT THE COMMUNITY?

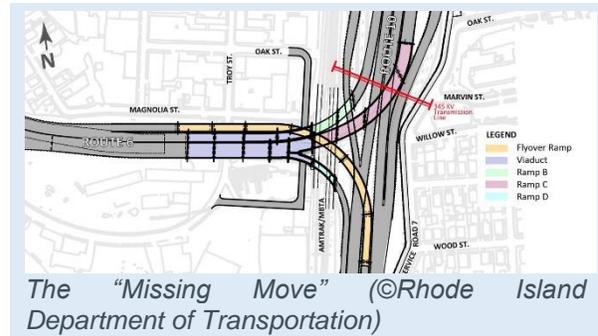
Many communities face the issue of an aging highway that divided communities. It can be difficult to balance national and regional freight needs of the interstate against local community needs. The 6/10 Connector does so through **context sensitive solutions** that reduce the footprint of the highway ramps and bridges, and adding in key connections, specifically:

- Replacing grade separations with surface streets on access roads.
- Adding new bicycle and pedestrian connections including 1.4 miles of new bike

paths and two new bridges over Amtrak tracks, connecting the nearby neighborhoods of Silver Lake and Olneyville as well as the Woonasquatucket Greenway and the Washington Secondary Trail.

- Building the “missing move” highway connection between Route 10 North and Route 6 West to remove traffic from local streets.
- Removing weaving sections such as those at Harris Avenue, which allows Harris Avenue traffic to access Route 10 South without the need to weave across Route 6 West traffic.
- Creating new real estate – the removal of the Harris Avenue ramp opens up 4.8 acres of additional real estate for development.
- Improved gateway aesthetics – such as a lighting arrangement to create a signature entranceway to Providence from Routes 6 and 10.

This project also represents a significant public and community collaboration. **Stakeholder engagement** activities included meetings with several advocacy and community advisory groups (such as moving Together PVD and Fix the 6-10 Coalition) along with public agencies that committed to exploring new options. **GIS Innovations** and **visualizations** were applied to communicate complex alternatives. Many options – from basic replacement to highway teardowns to urban boulevards - were explored, but the current solution represents a community agreement.



WHAT WERE THE BENEFITS?



A design build contract was awarded in December 2017 with construction scheduled to begin in early 2019.

Design work on the project is currently underway. The design-build approach that will save money and complete the project more quickly than anticipated.

It is also estimated that opening up the 4.8 acres from the ROW will also improve access to an additional 24 acres of underutilized land, creating a catalyst for other community improvements.

For more information:

- http://www.gcpvd.org/wp-content/uploads/2016/12/6-10_Shared_Vision.pdf
- <https://intvwpr.files.wordpress.com/2016/12/6-10factsheet120516-final3.pdf>
- <http://wpri.com/2018/01/15/pinpoint-traffic-blog-improving-the-6-10-connector-whats-next/>
- https://www.warwickri.gov/sites/warwickri/files/news/6-10_interchange_notice.pdf



Route 18 Improvement Project

New Brunswick, NJ

New Jersey Department of Transportation

Above: Commercial Avenue Bridge rendering (©NJ DOT).

Replacing older bridges and roads can spur great advances in nearby placemaking.

CONTEXT

- Constructed in 2010.
- Northeast.
- Suburban/Urban.
- \$200 million.
- 2 miles.
- 85,000 vehicles per day.



SAFETY+ IMPROVEMENTS

- Replacement of 6 bridges and new local roads led to new bicycle and pedestrian facilities.
- New and improved community spaces such as a promenade, park access, and amphitheater.
- Formalized community partnership teams brought all issues and stakeholders to the table.

WHAT WAS THE PROJECT DRIVER?

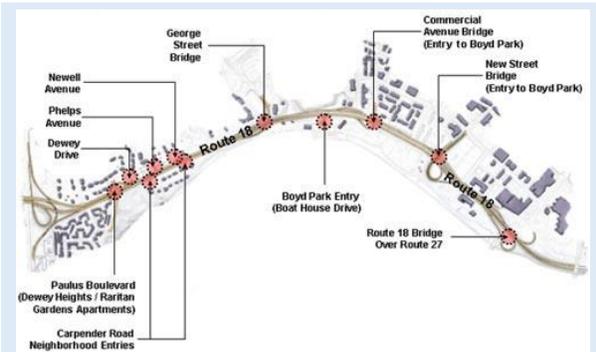
Many of the roads and bridges along Route 18 had been built from the 1950's through the 1970's and were showing their age. Crash rates were higher than statewide averages, and pedestrian facilities were desperately needed, as evidenced by the numerous worn footpaths in the area.

HOW DID THIS CONNECT THE COMMUNITY?

From these important transportation needs came an opportunity to enhance one of the primary regional thoroughfares that provides access to downtown New Brunswick, several key educational and employment centers, and rail lines.

In replacing the older bridges and adding outer local lanes, the New Jersey Department of Transportation (DOT) was able to also improve non-automobile access and connections to community assets more effectively. The newer outer roadways have wide multi-use paths along their entire lengths and at each bridge crossing to connect the city's downtown, institutions, neighborhoods, and recreational areas. Safer pedestrian crossings were added at key intersections, along with several new or enhanced pedestrian bridges. New sidewalks

and lighting were added to enhance the bicycle and pedestrian experiences. It also met NJDOT's **Complete Streets** initiative criteria, which draw upon national best practices to emphasize context-sensitivity in the design process and communicate the advantages and applications of various design options.



Project Map (©NJ DOT)

Furthermore, this project enhanced important natural and community spaces. NJ DOT did not just undertake access improvements, they helped support a more robust sense of place. A new ramped promenade now provides a scenic vista of the Raritan River and a grand entranceway for pedestrians into Boyd Park. A new amphitheater was built adjacent to the park pavilion as a new community asset. In addition, Boyd Park was extended into the former City Docks area, along with a new boat ramp and picnic pavilion.

The public engagement process pre-dates this project by over 10 years. On this project and many other projects at this time, NJ DOT pioneered the use of Community Partnering Teams (CPTs) as part of an intensive **Context Sensitive Solutions** approach to projects. CPTs are a formalized partnership with community **stakeholders** and the public to help work through transportation problems and solutions and keep all parties informed of the progress and development of the project.

The CPT also had several task forces to address key issues such as corridor aesthetics, design/development, Boyd Park enhancements, traffic management, and public safety. CPTs helped pave the way for more effective communication during project development and construction. The CPT was comprised of 198 members that met over 85 times during the project development process.

In addition, the project team used **visualization techniques** at all stages of the project, such as

- Photo collage of future improvements on local access roads.
- Drawings and renderings of the aesthetics, minor enhancements, new pedestrian access, and the new amphitheater design.
- Scale models at information meetings.
- Mock-ups and material samples to demonstrate the feel of the design elements for the bridges and retaining walls.

WHAT WERE THE BENEFITS?



The project provided multiple benefits. It expanded multimodal access through new bicycle and pedestrian facilities as well as improving access to nearby transit facilities. It minimized

the impacts of construction on the local community through an organized project delivery process. It provided a transportation solution that was more consistent with the local master plan, and it enhanced the overall public space experience.

Once completed, the George Street bridge received awards for outstanding bridge design (2010 International Bridge Conference, 2011 Engineering Excellence Award from the American Council of Engineering Companies, and 2010 Project of the Year from the American Society of Civil Engineers NJ Section).

For more information:

<http://www.state.nj.us/transportation/commuter/roads/route18/>

<http://www.nj.gov/transportation/capital/pd/documents/route18bestpracticesforum.pdf>

<http://gannettfleming.com/Projects/2015/02/24/17/22/george-street-bridge>



State Route 54 and Duck Creek Bridge

Brown County, Wisconsin

Wisconsin Department of Transportation and Oneida Nation of Wisconsin

Counterclockwise from top: the new Duck Creek Bridge and adjacent trails along SR 54 in Oneida; the new bridge, center of photo, is alongside the refurbished historical bridge, at bottom; Cattail designs by local artists are built into the bridge pier columns. (Photos courtesy of Mead & Hunt)

Inspired thinking transformed a typical bridge replacement project into new multimodal facilities that reflect residents' history, creativity, and identity.

CONTEXT

- Constructed 2012.
- Midwestern.
- \$5.4 million.



HIGHWAY TRANSFORMATION

- Upcycled failing historic bridge into a bicycle and pedestrian route.
- Assembled gateway design using new bridge, new highway alignment, roundabouts, and retaining wall.
- Built Oneida art into the project's foundations, both figuratively and literally.

WHAT WAS THE PROJECT DRIVER?

The State Route 54 (SR54) bridge over Duck Creek is located at the heart of the 102 square-mile Oneida Nation reservation, west of Green Bay. The Wisconsin Department of Transportation (DOT) determined the bridge was failing and decided that a new bridge was necessary. Additionally, children attending the elementary school in upper Oneida, needed a safer way to travel to the library in lower Oneida, just across the creek. However, the Oneida community regarded the old bridge as part of its cultural heritage.

HOW DID THIS CONNECT THE COMMUNITY?

The Wisconsin DOT worked closely with Oneida Nation officials, engaging representatives from various departments and ensuring that they addressed concerns like land management, environmental issues, planning, cultural issues, and engineering. Early on, the Oneida Nation planning staff realized that an alignment for a temporary bridge that would route traffic around

the replacement could serve as the alignment for the main highway. This insight into realignment was the start of the project's transformation—the proposal provided a separation allowing for green space, stormwater management features, and trails. The separation of the main highway also improved safety by moving traffic away from the community and making space for trails and highway underpasses. Constructing the new bridge downstream also made it possible to preserve the old Duck Creek Bridge, an important cultural resource for the community.



An aerial view of the Seminary Road roundabout reveals a landscaped turtle. The Turtle Clan is one of the three Oneida clans. (Photo courtesy of Mead & Hunt).

Context-sensitive solutions were integral to the project's development. Because of the limited space and the intent to minimize disturbance outside the roadway corridor, sidewalks were placed adjacent to the roadway on the western end in upper Oneida. In lower Oneida, a complete trail system was designed, most of it fitting within the original roadway alignment.

The project created a green space in front of the library as a buffer from the highway and for use as a learning area in a natural setting. It also accesses the trail network, so that children can safely cross SR54 under the new bridge.

Roundabouts at either end provided safe intersections that marked the change from a rural

context to a residential area. The roundabouts also incorporate community-identifying elements.

The project team integrated technology and culture. Unique computer aided drafting (CAD) replicated the artists' original drawings, and then artists reviewed them for detail and accuracy. The CAD artwork was incorporated into the plans and produced on the bridge through laser production techniques.

Clarity of communication was critical to success. The project team worked directly with Oneida Nation staff to assure a shared understanding of the project goals. The guiding principles revolved around a commitment to pedestrian safety, slower traffic speeds, and landscaping and design that was supported by the Oneida community.

Large groups of stakeholders and community members were convened. Some were from the Oneida government, such as the Business Committee, the General Tribal Council, and the Land Commission. Others were representatives from community organizations, such as the school board, the library, a veterans group, the housing agency, and the police department. All were affected by the bridge day-to-day and involved in the project.

WHAT WERE THE BENEFITS?



RENEW

The planning and design team leveraged the bridge project to connect the community, to provide a gathering space, and to strengthen tribal identity by incorporating landscaping and artwork by local artists. The bridge project completed a Safe Routes to School grant work and won several awards:

- FHWA Excellence in Right-of-Way Tribal Partnership Award (2012).
- American Council of Engineering Companies of Wisconsin Engineering Excellence Award.
- Oneida Nation Tribal Excellence Award.

For more information:

<http://wisconsin.gov/Pages/doing-bus/civil-rights/tribalaffairs/ne-region.aspx>

<http://onlinepubs.trb.org/onlinepubs/trnews/trnews294.pdf>

https://acecwi.org/wp-content/uploads/2014_EEA_Final.pdf



State Route 264 Safety Improvements

Navajo County, Arizona

Arizona Department of Transportation



Counterclockwise from top: Construction teams work on SR 264; a completed segment of SR 264 with wider shoulders and rumble strips (@Sunland Asphalt & Construction, Inc.); pre-project insufficient shoulders and steep drop-offs and local school bus service on route (@Arizona Department of Transportation)

A statewide safety review found this rural safety hotspot leading to the best return on investment solution.

CONTEXT

- Constructed 2015.
- Western.
- Rural.
- \$17 million.
- 25-mile corridor.
- 4,100-6,500 Annual average daily traffic.



SAFETY+ IMPROVEMENTS

- Safety hotspots identified through a statewide analysis.
- Multimodal facilities helped deliver a better return on investment.

WHAT WAS THE PROJECT DRIVER?

Through a systemic statewide safety analysis, the Arizona Department of Transportation (DOT) recognized that a sizable part of fatal crashes were roadway departures along rural two-lane highways. As a result, they identified State Route 264 (SR 264) from Burnside Junction to Summit One as a priority corridor for shoulder widening and slope flattening to address the high crash rate.

HOW DID THIS CONNECT THE COMMUNITY?

Nearby topographical constraints, such as steep slopes and large cross culverts, coupled with ROW constraints, led to the Arizona DOT developing a creative approach.

Using a **Performance-Based Practical Design (PBPD)** approach to maximize the return on investment, Arizona DOT developed two alternatives:

- **Alternative A:** Widen existing roadway to 34 feet; 12-foot lanes, 5-foot shoulders, add

centerline and shoulder rumble strips, flatten side slopes, install guardrail, etc. The 5-foot shoulder incorporates a 4-foot bikeable width outside of the rumble strip.

- **Alternative B:** Widen existing roadway to 40 feet; 12-foot lanes, 8-foot shoulders, add centerline and shoulder rumble strips, flatten side slopes, and install guardrail.

Evaluation criteria included road safety benefits and economic value. The safety analysis used Highway Safety Manual predictive method procedures and the Interactive Highway Safety Design Model. In this case, the local calibration factors were adjusted to reflect conditions on other rural two-lane, two-way state highways on tribal lands. This allowed for the model to reflect **context-sensitive conditions**. The economic value was determined through a benefit-cost ratio analysis, and the monetized benefits included the reduction in crashes and the reduction in the severity of crashes.

Arizona DOT determined that Alternative A had the lower overall cost and higher benefit-cost ratio, and was thus the better option.

In addition, Arizona DOT was able to build new modal facilities to help provide greater access to services and opportunities for the Navajo Nation and the surrounding rural communities.

Roadway Element	Existing SR 264	Alternative A	Alternative B
Lane Width	12 feet	12 feet	12 feet
Shoulder Width	1 foot	5 feet	8 feet
Construction Costs	\$0	\$16.5 mil	\$26.3 mil
2016-2036 Expected Total # of Crashes	636	532	504
% Reduction of Crashes over Existing Conditions	N/A	17%	21%
Benefit-Cost Ratio	N/A	2.3	1.9

Results of PBPD-based alternatives analysis (Source: FHWA)

WHAT WERE THE BENEFITS?



REPAIR

Through PBPD, Arizona DOT quantified the safety and operational deficiencies of the corridor, and developed safety and operational improvements while accommodating bicyclists in the final design. With the lower overall cost and higher benefit-cost ratio, Alternative A had an estimated annual benefits of approximately \$3.8 million over the existing road.

As a **pilot project**, the savings realized by using the PBPD approach can now be used on other similar highway corridor projects in Arizona.

For more information:

https://www.westernite.org/annualmeetings/13_Phoenix/Presentations/Session%203D%20-%20Kar.pdf

<https://www.fhwa.dot.gov/design/pbpd/documents/fhwahif15014.pdf>



State Route 520 Eastside Transit and High-Occupancy Vehicle Program

King County, Washington

Washington State DOT



Counterclockwise from top: Bird's eye view of the SR520 Eastside corridor; boarding platform in the SR520 median; recreational facility developed with community input provides a view of Lake Washington (all photos ©Washington State DOT)

Improvements to address freeway seismic vulnerabilities led to significant transit, bicycle-pedestrian, and trip reliability benefits while creating new public open space.

CONTEXT

- Completed in 2015.
- Western.
- Urban/Suburban.
- \$363 million.
- 2.3 miles.
- 700 buses daily.



HIGHWAY TRANSFORMATIONS

- Adds transit/high-occupancy vehicle lanes, shoulders, bicycle-pedestrian elements, and three landscaped highway lids.
- Compatible with a potential future light rail.
- Provides environmental enhancements including “fish-friendly” culverts.

WHAT WAS THE PROJECT DRIVER?

State Route 520 (SR520) connects Seattle to cities east of Lake Washington (the “Eastside”). Inspections of the highway’s fixed bridges, built in the early 1960s, determined they were at risk of collapse in an earthquake, while the original SR 520 floating bridge was vulnerable to severe windstorms and waves. Further, growth in the area was forecasted to continue at a rapid pace. To better withstand seismic activity and address current and future travel time delays, the Washington State Department of Transportation (WSDOT) moved to replace the highway’s bridges. This effort served as the impetus for improvements to the Eastside corridor that remedied longstanding issues and provided new livability enhancements.

HOW DID THIS CONNECT THE COMMUNITY?

The SR520 Eastside Transit and High-Occupancy Vehicle (HOV) Project adds numerous connectivity benefits. SR520 was widened from four lanes to six lanes, adding dedicated transit and HOV lanes in each direction. Wider and safer shoulders were also added throughout the Eastside corridor. When SR 520 reconstruction is complete all the way to I-5 in Seattle, these travel time reliability and **improved transit service** components are expected to reduce typical peak-hour commutes between Seattle and the Eastside by half an hour. WSDOT also designed the project to be compatible with a potential future light rail system.



A landscaped highway lid provides multimodal connectivity (©WSDOT).

The Eastside project also adds three landscaped highway lids across SR520. These lids physically reconnect communities long separated by the old highway. They also link local bicycle and pedestrian paths to the first segment of a regional shared-use trail that parallels SR520. This 14-foot-wide path will eventually stretch 12 miles from Seattle to Redmond and significantly improve non-motorized commuting options and recreational opportunities for area residents. WSDOT also partnered with local municipalities to build connections from the SR520 shared-use trail to nearby community resources and amenities. Two of the three highway lids feature accessible **transit user accommodations** that provide stairway and elevator access to sheltered transit

stops located in the SR520 median underneath the lids. These median transit stops offer riders safer access and more reliable travel than prior configurations. By providing connections to local and regional bicycle-pedestrian paths, the lids also offer **expanded access to transit**.



SR520 includes livability enhancements (©WSDOT)

In planning and developing the project, WSDOT employed **context sensitive solutions** to ensure improvements to the Eastside corridor were shaped by community input. Public engagement activities included dozens of outreach activities and multiple community **design charrettes** that helped establish corridor features and aesthetics. These activities ultimately influenced the design of the highway lids, shared-use trail, and transit stops. The project also provides “fish friendly” culverts and other enhancements to the natural environment.

WHAT WERE THE BENEFITS?



RENEW

By significantly reducing peak-hour travel time along the corridor, the SR520 Eastside Transit and HOV project addresses the region’s growing mobility needs while also improving travel by transit and non-motorized modes. Further, the project brings a host of livability and environmental benefits that will help to ensure the region’s future success. WSDOT’s benefit-cost analysis estimated a 123 percent return on investment when factoring for things like short-term jobs creation and travel time savings, but not factoring for induced growth.

For more information: <https://www.wsdot.wa.gov/Projects/SR520Bridge/MedinaTo202/>



Target Field Station

Minneapolis, Minnesota

Hennepin County

Counterclockwise from top: Bird's eye view of Target Field Station; canopied light rail boarding platform; public event at the Target Field Station Amphitheatre (all photos © Morgan Sheff. Courtesy Perkins Eastman).

A multimodal nexus that seamlessly integrates transit, design, and cultural elements contributes to a dynamic public space.

CONTEXT

- Opened June 2014.
- Midwestern.
- Urban.
- \$79.3 million.
- 140,000 square feet.
- 500 train arrivals/departures each weekday.



MULTIMODAL TRANSPORTATION CENTERS

- Provides intermodal connectivity among light rail, commuter rail, and city buses.
- Improves surrounding street grid, enabling better and safer access to public transit.
- Incorporates placemaking elements.
- Design accommodates future light rail lines.

WHAT WAS THE PROJECT DRIVER?

The popularity of light rail transit (LRT) with spectators of Minnesota Twins baseball games led to higher than anticipated ridership, causing long lines and crowding at boarding platforms after games. Additionally, fans wanting to walk to the adjacent North Loop neighborhood had to cross active LRT tracks. With the scheduled opening of a second LRT line in 2014, the need to accommodate new travel demand and enhance neighborhood connectivity became clear. Ultimately, A \$10 million Transportation Investment Generating Economic Recovery (TIGER) grant award in 2011 served as a catalyst to realizing a shared vision for the new Target Field Station as an intermodal connector and iconic public space. In a unique public-private partnership, nearly 10 other organizations, including the Minnesota Twins, also contributed funds toward the station's development.

HOW DID THIS CONNECT THE COMMUNITY?

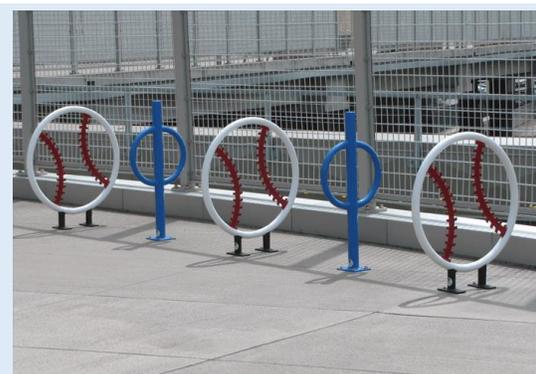
Prior to 2014, with only one LRT platform, post-game lines and train delays proved a disincentive to further transit ridership growth. The new Target Field Station of 2014 provides spacious and safe queuing areas for fans waiting to board two LRT lines. The new second platform makes simultaneous boarding of Blue Line and Green Line trains possible. Additional **transit user accommodations** include canopied boarding platforms, accessible wheelchair ramps, and on-demand heating.

The completion of station improvements in May 2014 also aligned with the opening of the METRO Green Line in June 2014, which connects the area to neighboring St. Paul. Further, station improvements provide increased access and intermodal connectivity to the existing METRO Blue Line LRT, Northstar Commuter Rail line, and a dozen bus routes that stop at or near the station. Target Field Station's new underground parking garage and connections to bike trails and a bikeshare system offer **expanded access to transit** for area residents and commuters. Additionally, the station update incorporates a "plug and play" design that will allow planned LRT line additions to seamlessly connect when they come online.

The transformational vision for Target Field Station extended beyond transportation improvements. This concept included infusing culture with transit design and open space that would make the station an appealing destination for both transit users and non-transit users, while also attracting real estate development to the area. Amenities that support this "open transit" concept include public spaces, public art, and an amphitheater. By integrating **improved transit service** with cultural elements, enhancements to Target Field Station increased both physical and social connectivity for the 3,000 residents and 40,000 workers located within a half-mile radius of the facility.

The use of **context sensitive solutions** to engage community members and stakeholders in the design process was key to success of this vision. Initially,

area residents had misgivings about the construction of a transit hub in their neighborhood. To address this, Hennepin County hosted a **design charrette** that brought together more than 50 participants including residents, architects, and designers to review early plans for the station. Together, this group came up with a solution that moved the alignment of LRT tracks from an adjacent street to the site of a County property nearby. This solution removed a visual obstruction between the neighborhood and the site, and also made space for wider sidewalks and future development. Importantly, this and other public engagement efforts by Hennepin County helped garner support for the project and worked to ensure the vision for the station reflected residents' values.



Twins-themed bicycle racks (@Hennepin County).

WHAT WERE THE BENEFITS?



In addition to the project's connectivity benefits Hennepin County's commitment to quality design and cultural space have catalyzed redevelopment of the area and created economic opportunity. These include the creation of 300 full-time jobs directly tied to the station's construction and the development of a nearby nonprofit headquarters that brings more than 900 new workers to the area. Additionally, construction has begun on a nearby 156-room hotel and entertainment center. Awards:

- American Public Works Association: Public Works Project of the Year (2015).

For more information: <https://www.hennepin.us/targetfieldstation>



U.S. Route 301/Gall Boulevard Widening and Realignment

Zephyrhills, Florida

Florida Department of Transportation

Counterclockwise from top: Aspirational example (© Greater Zephyrhills Chamber of Commerce); US 301 (Gall Boulevard) in its current condition (Original Photo: ©2015 Google®).

A downtown vision unlocked the key to this project's solution.

CONTEXT

- Design phase.
- Southeast.
- Rural.
- Cost:
 - Design: \$3.4 million.
 - Right of Way: \$26 million.
- 2.6 miles.
- Annual average daily traffic 27,300 for all three roads (U.S. 301, 6th and 7th St).



COMPLETING THE STREET

- Reroute US 301 to avoid the downtown core through existing couplets.
- Widen the new US 301 to meet freight demand.
- Addition of new bike lanes and sidewalks.

WHAT WAS THE PROJECT DRIVER?

Plans for widening US 301, a state highway and main north-south corridor in Zephyrhills, have been in the works for more than a decade, intended to alleviate freight congestion through downtown Zephyrhills. However, an acceptable solution never materialized that addressed congestion, minimized business impacts, and honored historic assets in the downtown core of Zephyrhills.

HOW DOES THIS CONNECT THE COMMUNITY?

After years of meetings and revisions based on community feedback and **community impact assessments**, it became clear to the Florida Department of Transportation (DOT) that the right solution was to “trade places” with the City, giving it ownership of Gall Boulevard/US 301 while taking ownership of an adjacent parallel one-way couplet. This project will widen US 301 from two lanes to a four-lane divided roadway from State Route 39 to Corey Street in Downtown Zephyrhills. Once built, the new roadway will connect to two newly widened three-lane one-way roadways that parallel existing US 301 from Corey Street to County

Road 54. This project will also reroute U.S. 301/Gall Boulevard from the commercial core and main street of Zephyrhills to the widened 6th St and 7th St one-way couplet. Other improvements include the addition of bike lanes and sidewalks along both sides of the one-way couplet roadways. Bike lanes and sidewalks already exist on Gall Boulevard.



The widening and realignment keeps the central business district intact and discourages the use of the main thoroughfare as just a passthrough. It allows the city to take back control of its central commercial corridor to create an environment conducive to walkability supportive of small businesses.

The project supports the city's vision for this corridor. A community visioning effort wanted to transform the U.S. 301/Gall Boulevard Corridor from a strip-commercial, car-focused highway to a mix of commercial, office, and residential uses arranged in mini "activity centers" that are as accessible to people on-foot and bikes as they are to cars. New development on the corridor would resemble a traditional "Main Street" including buildings built near the sidewalk and a grid network of streets that comfortably accommodate all users. Functional and attractive public open space and infrastructure would complement residences, workplaces, and shopping destinations and be designed to help meet the community's sustainability goals."

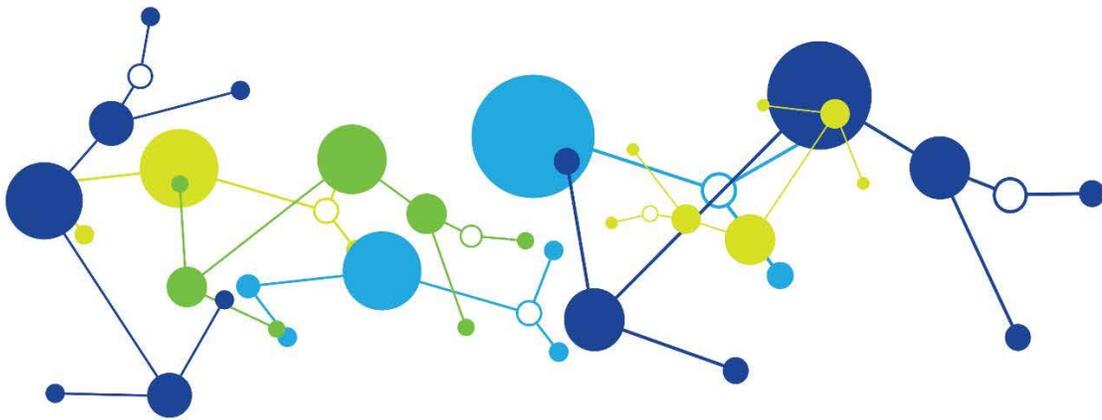
As part of the corridor visioning effort, the city conducted a series of **stakeholder engagement** workshops to define the vision for Gall Boulevard and the downtown core of Zephyrhills. A visual preference survey, one form of a **visualization technique**, helped consultants identify the scale and form to which the community would like to see future development. The resulting product of this visioning process was a form-based code to guide future development on Gall Boulevard.

WHAT WERE THE BENEFITS?



The transformation of the U.S. 301/Gall Boulevard corridor in the city's center gives the City of Zephyrhills the opportunity to shape Gall Boulevard into a great street that is vibrant, walkable, and economically sustainable.

For more information:
<http://www.fdottampabay.com/factsheet/375>
<https://www.ci.zephyrhills.fl.us/404/Reimagine-Gall-Boulevard>



Office of Planning, Environment & Realty
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